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Incorporating Food Industries Weekly

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FOOD MANUFACTURE

Vol. XXVI. No. 12 · Published Monthly · December 1, 1951

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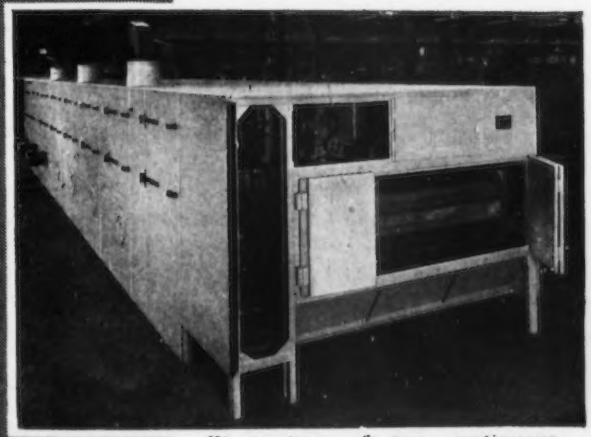

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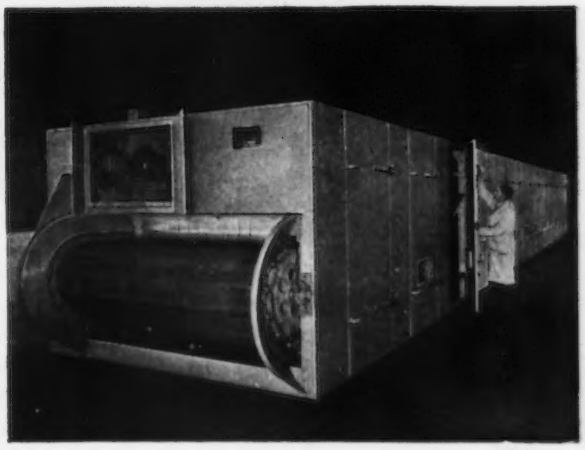

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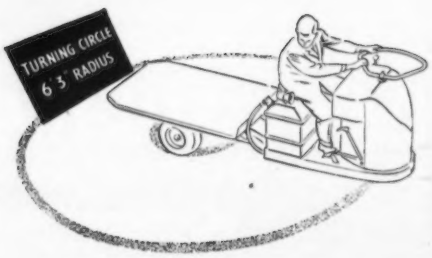

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FOOD MANUFACTURE

Vol. XXVI, No. 12 December 1, 1951

Canning Scientists Meet in Paris

ON our arrival at the first session of the Second International Canning Congress in Paris we were imbued with an unaccustomed sense of the immutability rather than the mutability of human affairs, when we met so many of our friends who, like us, had attended the first congress in 1937.

The *mise en scène* was reminiscent of that earlier congress—there on the platform was the long table at which were seated members of the committee and, in the presidential chair, Mr. R. V. Manaut, who occupied it in 1937. Perhaps it was only in our imagination that we saw the ghosts of Nicolas Appert and Louis Pasteur—smiling a little at the fact that the papers being read were all based on their fundamental work.

True, Father Time had been up to his tricks, aided by the terrible upheavals of the years between 1937 and 1951, but these had not curbed the enthusiasm of the older delegates. New faces among them represented the rising generation, many of whom were embarking upon their careers at the time of the first congress. Their contributions were tokens of "laborious days" spent and promises of further work to come, of a calibre worthy of being put alongside that of their eminent predecessors.

The time of the first congress coincided with rumours of war. In an editorial in the December, 1937, issue of FOOD MANUFACTURE, on the subject of the first congress we said that "it promised to constitute a foundation upon which might grow an ever-increasing international co-operation in an all-important subject—the feeding of the multitude—and perchance through this to peace."

We venture to repeat this. May our guess be better this time.

More and Better Tomato Juice

In these days when chemicals in foods are very much in the limelight, it is necessary to tread warily when considering any new, or comparatively new, proposal for their use, but the inclusion of sodium hexametaphosphate in certain foods is permitted by the U.S.A. Food and Drug Administration, although not for its use in the manner described here, except by special permission.

After eighteen months of experimentation, Dr. Roy E. Morse, of Monsanto Chemical Company's food technology laboratories, found that by the addition of 1 per cent. of sodium hexametaphosphate to tomatoes prior to juicing for the purpose of tomato juice production, not only were there reduced losses of vitamin C, but also an increased yield of juice, estimated to be as much as 10 per cent.

According to a report published in *The Canner* (June 30, 1951) Dr. Morse attributes the increased yield to what he calls the sequestration of the calcium by the phosphate, which prevents the calcium from combining with the pectin to form sticky gels which hold some of the juice in the pulp. Moreover, the increased pectin content in the juice makes it smoother and brighter.

As to the conservation of vitamin C, it is stated: "Dr. Morse's experiments indicate that the chemical ties up the copper and prevents it from speeding up the reaction of oxygen and vitamin C. How it does this is still not clearly understood."

A Year with the Herring

Achievement in the face of difficulty is the theme of that part of the sixteenth annual report of the Herring Industry Board devoted to research and development.

In the field of research, a varied programme of work has been carried out at the Board's herring canning research station. Investigations have been conducted into the pre-treatment of herring for canning, which has led to further experimental work necessitating the construction of special apparatus.

Efforts are being made to find colouring matters that will remain stable in sauces and, at the same time, conform with official requirements relating to the purity of food in various overseas markets. The results of attempts to evolve, in particular, an improved tomato sauce to replace the ordinary purée have been encouraging and are being continued.

Other work in progress concerns *ad hoc* investigations into the suitability of certain transparent wrappings for smoked fish and plastic containers for cured herring.

The calendar year 1950 witnessed a further expansion in the usage of herring for oil and meal production, 203,000 crans being processed, compared with 124,000 crans in 1949.

The technique of oil production by the Herring Industry Board/Torry chemical process having been fully mastered, efforts were applied in 1950 to the solution of the considerable problem of protein recovery. In this, the Board have had the assistance of Dr. J. A. Lovern, of the Torry Research Station, who was able to deduce from earlier work and feeding trials the means whereby the chemical process could be operated so as to effect the minimum degradation of the protein. He recommended certain modifications which, when adopted, allowed of the production of a material which has been found to have a feeding value about midway between those of groundnut meal and orthodox "cook-and-press" herring meal.

This comprises a considerable technical and economic advance from which, unfortunately, it will be impossible fully to profit so long as certain indispensable equipment continues to be almost unprocurable.

The difficulty of carrying out these and other developments increases daily as the rearmament programme gets under way; the Board, therefore, are to be congratulated on the initiation and completion since 1946 of a comprehensive series of projects, among which may be mentioned the erection at Lerwick of the second largest quick freezing plant in the United Kingdom; the erection of a kipper chilling and quick freezing plant, cold stores, and ice making plant at Stornoway; the setting up of a herring canning research station with a quasi-commercial scale canning line at Port Glasgow; the evolution of an entirely new system of producing edible oil and animal feedingstuffs from herring and the erection of two factories to operate the process on a full commercial scale; and the introduction, development, and establishment of machinery for gutting herring for curing.

Night Baking

The question of night baking and the desirability or otherwise of abolishing or limiting this practice has once more come under discussion.

There have been many developments since the publication of the report of the Alness Committee (FOOD MANUFACTURE, **12**, 9, p. 290). There was, for example, the passing of the Baking Industry (Hours of Work) Act of 1938 which limited rather than abolished night baking. During the war the practice in such places as Birmingham and Glasgow was to abandon night baking and to bake one day for the next.

In the peculiar circumstances of war-time these arrangements seem to have worked with a reasonable degree of success, but the areas involved were so limited, the extent of abolition so incomplete, and the general evidence as to its functioning so slight, that it was not proved whether the universal abolition of night baking in all parts of Britain under peace-time conditions was feasible.

At the end of the war negotiations were begun on a national level between the two sides of the industry and early in 1946 a Joint Committee was set up, with sub-committees covering England and Wales, Scotland, and Northern Ireland, for the purpose of considering the question of abolition.

Progress on the Joint Committee was extremely slow and little was done after November, 1948. Further discussions took place between the Ministry and the two sides and on July 20, 1950, the then Minister of Labour and National Service announced in the House of Commons the decision to set up the present Committee under the chairmanship of Sir Frederick Rees.

In its recently published recommendations, the Committee submit the opinion that legislation should be introduced requiring every bakery in England, Wales, and Scotland to choose between one of two courses: the employment of no person on the manufacture of bread and flour confectionery between 10 p.m. and 5 a.m., or the employment of no person between these hours for more than half the weeks worked in any calendar year.

Whichever course is adopted, there would be various exceptions. For example, an establishment should be permitted to employ men outside the permitted hours on one night per week to meet the requirements of the week-end trade or the Jewish Sabbath, and also in the event of breakdown of machinery or illness of employees. The regulations could also be waived on a night preceding the day before a statutory holiday and would not apply at any time to master bakers.

At present the making of bread and flour confectionery usually takes place on different shifts in England and Wales. In Scotland, however, it is possible to interchange employees between the two kinds of work because the Scottish apprenticeship scheme ensures training in all branches of the industry. Such an interchange is not yet possible in England and Wales, but it will increase as a result of the introduction of a similar apprenticeship scheme.

Once such difficulties have been overcome, a rotation of shifts similar to the one suggested in the report could take place without much dislocation in any bakery.

As is pointed out in the report, there is nothing to prevent the two sides of the industry at any time from agreeing on more favourable conditions than those proposed. Perhaps the influence of this, the third Committee on Night Baking, will stimulate progress towards an effective system of joint organisation and negotiation which is desirable in the best interests of the baking industry and the public which it serves.

Fish Quality

At a recent conference of the Royal Sanitary Association of Scotland neither Mr. Thom, Aberdeen's chief sanitary inspector, nor Dr. Shewan, of the Torry Research Station, can be said to have spoken encouragingly about the prospects of improving fresh fish quality. As is widely known to students of food technology, a vast amount of research has been devoted to the preservation of "freshness" in fish during the somewhat cumbersome journey from seas to shops. What matters most in practice is whether the ships, the markets, and the inland railway trucks can provide suitable conditions.

Figures actually point to falling rather than improving standards. In Aberdeen in 1938 14 tons of fish were condemned. In 1943 the figure was 793 tons. The abolition of price control in 1950 brought about a sharp improvement in quality when the condemned weight dropped to 255 tons. But the comparison should be made with pre-war standards, not with those of the war and immediate post-war years. One adverse factor is the steadily increasing necessity for long voyages. North Sea catches have become too small to be profitable; but to make economic the longer trips to Iceland or the White Sea trawlers had to pack in more fish than they were suited to carry.

Mr. Thom stated that the fish rooms of Aberdeen trawlers were often unsatisfactory and the greater portion of the fleet of some 220 vessels was out-of-date. Crews were poorly housed and the general working conditions failed to attract the type of man who would be likely to handle fish with the care that a delicate foodstuff required. Insulation was bad and old woodwork was constantly saturated by rapidly melting ice. The railway vans also came in for some adverse criticism; bad insulation caused ice to melt too quickly and fish heated in the longer journeys southwards. As for the premises where fish was handled, many sheds and shacks were describable as fish houses by courtesy only; a drastic system of licensing was urgently required.

Dr. Shewan considered that any improvements to be obtained from present methods were small when set against the magnitude of the total problem. Real progress in quality retention depended upon radical changes in the technique of preservation, especially when the catch was made in distant grounds. Freezing the fish at sea seemed the most hopeful solution in sight. The Torry Research Station's major job at present was the development of plant and methods that were suitable in the limited space of a modern trawler for freezing at sea.

These are authoritative assessments of the present state of the fishing industry at a major port, and no one could pretend that they are satisfactory. Although present methods and equipment could and should be improved, the results thus obtainable will not do more than scratch the surface of the problem. This offers small inducement to owners of old trawlers to spend capital on improvements, especially if the real solution—and therefore the future—lies with modern vessels equipped with freezing plant.

Education in the Dairy Industry

Is it true to say that education in industry will mean that employees may seek positions of greater responsibility and more pay elsewhere? While denying this, the Wharfedale Creamery Co. state that even if it were true, the industry as a whole must benefit—a sufficient reason for the promotion of a higher technical standard.

This company have realised that any lead in this respect must come, in the first instance, from the management and that it is unfair to expect dairy employees to investigate the sources of further education on their own initiative.

When the City and Guilds of London Institute issued the revised course in elementary dairy technology, the company felt that a course on similar lines might well be run on their own premises, especially in view of the fact that the nearest course was being held some twenty miles away—a journey which the staff would be unlikely to make twice a week.

Accordingly, for the past four months, talks have been given once a week at the creamery premises with promising results. To encourage their workers, the management have instituted a scheme by which those attending regularly, even though failure in the examinations ensues, will receive a bonus of 2s. 6d. a week, those gaining a second-class certificate, 5s. a week, and for a first-class certificate, 7s. 6d. a week.

It is possible that some companies, whatever their sphere of activity, have hesitated to take similar action because of the fear that the staff might not respond, but the experience of this progressive creamery should encourage other managements to assist their employees in attaining a higher technical standard, and those concerned must be commended for their initiative and long-term view.

The World's Food

That there was a real danger of urgent agricultural requirements being overlooked and of the current modest plans for economic betterment being slowed up in many under-developed countries because of the formulation of huge defence programmes was the warning given by Mr. Dodd, American Director-General of FAO, in his annual report on the state of food and agriculture for 1950-51.

He found that the three per cent. food production increase represented real progress and was not just a

temporary fluctuation caused by the inevitable ups and downs of heat and cold, and wind and rain.

Increased food output must be measured against world population growth and, in the final count, against the degree of equal distribution of foodstuffs round the globe and to all sections of the population. Although last year's increase in production slightly outran the population growth, it did little to raise nutritional levels in areas where it was most needed. Output showed the biggest gains in areas generally already well fed.

Further points in this report, which surveys the food situation in every country of the world, were that there had been a general increase in the productivity of European agriculture, output per unit of land area and per animal being above the pre-war average.

In most Latin-American countries total food supplies for domestic consumption were more plentiful than a year ago and consumption per head reached an all-time record. In the Near and Middle East, 1950-51 was a good agricultural year on the whole, although development did not keep pace with the rapid population growth.

Bumper crops in China were reported by the Peking Government. In many Far Eastern and other countries concerned with the export of raw materials, there was a sudden shift from unfavourable to favourable trade balances, mainly by reason of the price increases of rubber, tin, fibres, and oil seeds following the outbreak of war in Korea. Reported locust invasions in the Western and Eastern states of India, West Pakistan, and many parts of the Near East, might cause serious losses to the next crops, unless this pest could be checked by international action or otherwise.

The largest sugar crop in history (34,000,000 metric tons) was harvested in 1950-51. The demand for sugar has also increased and last year's crop was slightly smaller than in the previous year.

It was a good fish year in 1950 with an increase of about nine per cent. in world production. There was remarkable relative progress in the output from South African, Israeli, and Japanese fisheries.

The Onion on Trial

Four American doctors in Chicago have contended —and not without experimental evidence—that onions induce anaemia. Whether the onion should be looked upon as a flavouring addition to other foods or whether it is a positive food within its own right might perhaps be open to discussion, but we never expected it to be regarded as dangerous.

Dr. M. Kalser and a number of students of the University of Illinois ate over two pounds of cooked onions per day in addition to normal diet. After five days they felt tired, had pale finger nails, and blood counts showed a large drop in red cell count; indeed, after seven days, the count was down by a million and a half. They all recovered from the anaemia seven to ten days after stopping the onion addition to their diet.

Other experiments with dogs showed that a far more severe condition of anaemia was produced, with a loss of 50 per cent. of the red cells within fifteen days.

It should be pointed out that these experiments were carried out to measure the effects of excessive onion consumption. There is no suggestion by the doctors that a moderate daily garnish with onions could be harmful.

The research was originally aimed at finding a cure or treatment for polycythaemia, an ailment caused by excessive red cell production in the blood. It may be that in the case of this malady, lots of onions may be curative, rather than harmful, agents.

Election Retrospect

With so much attention now being paid to the current fashion of modifying English usage, a chapter might well be written on similes and metaphors based on feeding and cooking.

Quite a number of candidates in the recent election campaign were considered to be "half-baked" by some of their opponents. If the candidates escaped this opprobrium, then their policies were "well-peppered" or "well-basted" by the "crusty" old heckler in the audience.

What is striking is the inevitable derogatory nature of most culinary terms thus applied. Before long, we are assured, some Minister or other will be "in hot water" again, though it will be his critics who will be "boiling with rage." The next time he speaks in public these critics will "grill" him or even "make mincemeat" of him. But it won't stop him landing us "in the soup" or "in the stew" if he "makes a hash" of everything.

The only note of relief was when an attractive lady candidate made her speech. She was "a duck" and, in face of criticism, remained "cool as a cucumber."

FUTURE ARTICLES

ARTICLES to be published in forthcoming issues of FOOD MANUFACTURE will include the third part of Mr. J. A. Radley's article on the manufacture of maize starch; the fifth article in the series "Food Controls in Great Britain," by C. G. Daubney; "Automatic Control in American Food Plants," by Leo Walter and Jack Meyer; and progress articles on milling, baking, and the vitamins.

America's New Citrus Juice Plant

One of the latest and most notable additions to America's expanding citrus juice processing industry is the new plant at Fullerton, California. Owned by the Golden Citrus Juices, Inc., the plant was built and fully equipped in four months; within three hours of its coming into service it was working at near-capacity.

SPACE has been reserved throughout the plant to enable further equipment to be introduced. Specially flexible equipment has been designed, one example of this being the evaporator, which was built in two effects, with provision for a third, which will bring the unit up to the planned production capacity.

The chlorination system has been designed to reach every point where quality might be affected by the action of micro-organisms. Valves at diversion points have been close-coupled, and all equipment in contact with the juice is of stainless steel.

Fruit Storage

A continuous type scale is used to weigh fruit coming into the plant and a sample is taken by a cam-operated diversion arm, the main flow proceeding to predetermined bins. Conveying capacity is 30 tons of citrus fruit per hour, the maximum capacity of the unloading system and conveyors leading to storage bins being 36 tons per hour.

Air is circulated through the fruit while in storage. This is achieved by the use of specially constructed storage bins consisting of steel beams with expanded sheet metal walls. Each of the two bins is divided into six compartments. Runways down which the fruit is diverted distribute the weight of the fruit to prevent crushing. Each compartment takes 17½ tons, totalling 210 tons for the two bins, which is approximately 12 hours' supply for the plant.

Cleaning Operations

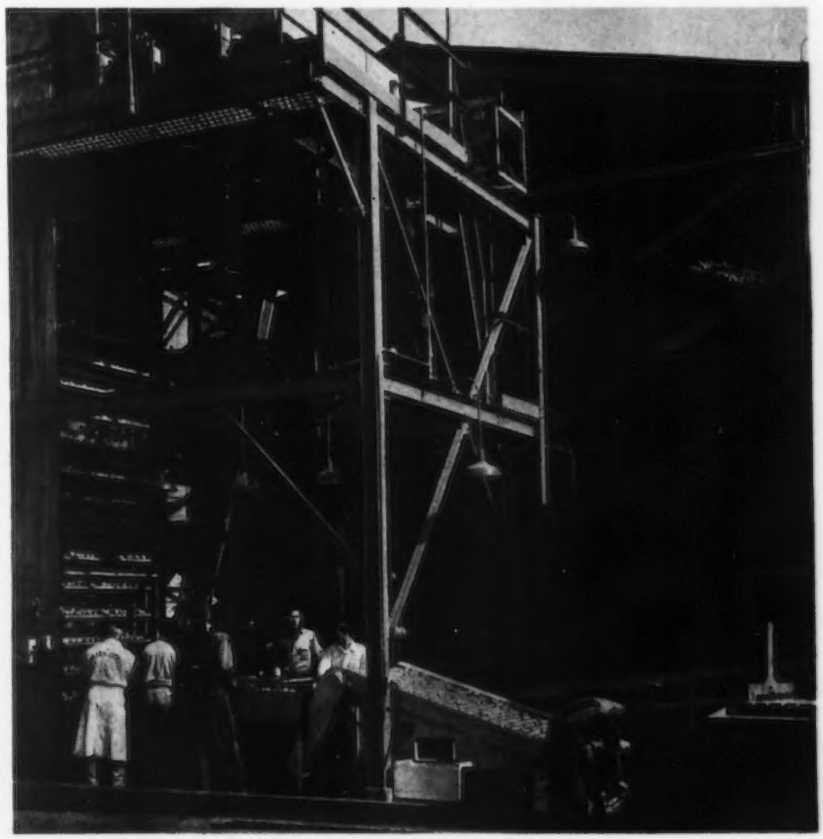
Following inspection, fruit is alternately floated and submerged in a soaking tank by automatic paddle-like devices. The tank, which is filled with a detergent solution of trisodium phosphate and Triton in water containing 50 p.p.m. chlorine, is equipped with steam coils to heat the solution. The fruit is lifted and drained by a roller conveyor, then scrubbed by ten consecutive rows of revolving brushes, first under sprays of detergent solution, then under chlorine water sprays. After a final inspection, the fruit moves by roller conveyor to the size grader, and is sterilised by a final spray of chlorine water. The capacity of the washing line is 30 tons per hour.

Grading and Halving

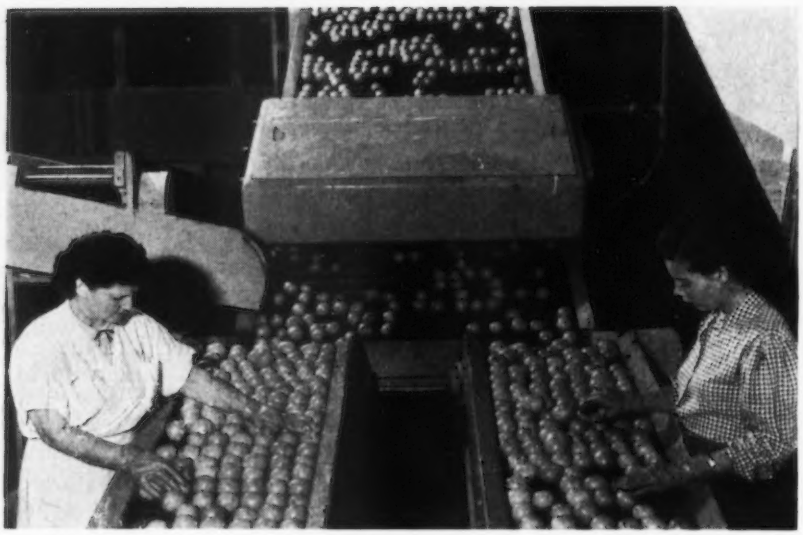
The fruit is graded into three sizes, each being moved to the extraction machines by separate pull-out belts. Up to three tons of fruit per hour are handled by each extracting unit, and production is as high as 130 gallons per ton. As fruit is fed into the extractor hopper it is picked up by cups attached to a conveyor chain and moved under a stationary knife for halving.

Juice Extraction

The halves are discharged, as cups pass over the forward sprocket, into a rotating synchronising device, taking them to the reaming heads and feeding one into each rubber cup. The latter are closed round the orange halves by a cam action, and as they move, reamers enter from below to remove the juice. Rotating on their own shaft, which in



The fruit receiving station and storage bins.



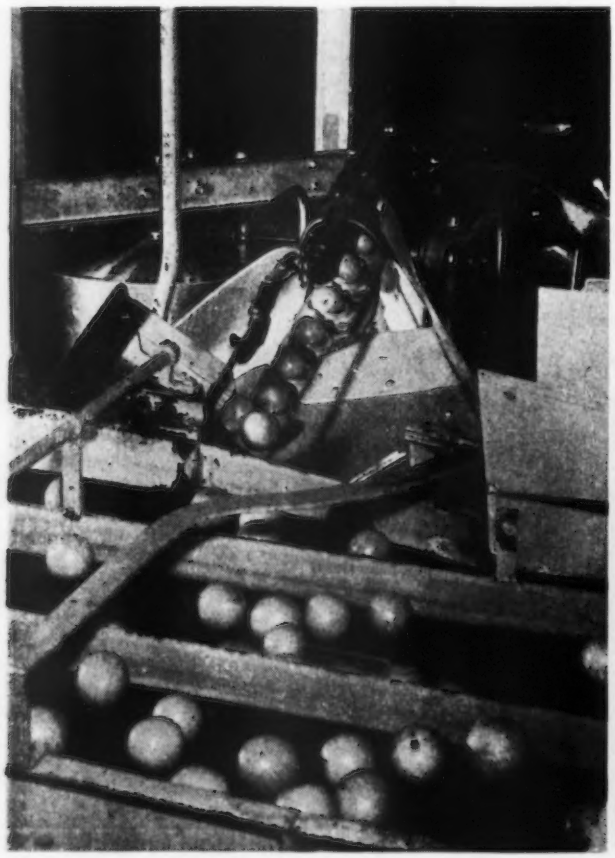
After inspection, the fruit is conveyed through two cleansing and sterilising baths.

turn rotates with the carrying member mounted on the machine, the reamers are withdrawn from the rubber cups at points of loading and peel discharge, while penetrating into the cup pocket at extraction. Following reaming the cam opens each cup to discharge the peel, which drops into the gathering screw conveyor while juice flows into a trough.

Pulp and seeds from the finishers drop into a gathering screw conveyor which feeds a screw elevator and conveyor discharging into peel bins dumped by gravity through steel chutes into trucks. Reject screw capacity is 2 tons per hour, and of peel screws, 12 tons per hour. Total peel storage bin capacity is 50 tons, equal to about four hours' running time.

Treatment of Finished Juice

Juice discharged into a covered, stainless steel trough flows to pumps feeding the coarse finisher, consisting of a revolving helical screw operating within a cylindrical stainless steel screen through which the juice is filtered. Finished juice is pumped to one of the three blending and sweetening tanks each equipped for mixing and cooled by circulation of a refrigerating medium in the jacket. At this point sugar is added if required, the quantity being calculated following tests on the fruit; it is added to either of the three tanks from a swing spout, the amount being regu-



The fruit is conveyed by belt to the juice extractors.

Double effect evaporator for processing the freshly extracted juice.

Both visual and recording thermometers are included in the master control panel.

Steam sterilised cans are fed by gravity to one of the battery of can fillers.

lated by a vibrator-timer. The juice is then cooled and pumped to the fine finisher, where all particles larger than 0·027 in. are removed. It then proceeds to the evaporator.

The installation gives a double-effect evaporation. Each column contains 199 three inch stainless steel tubes, totalling 3,126 sq. ft. of heat transfer surface. A system of three steam ejectors and condensers removing vapours and non-condensable gases produces the vacuum. Chilled water, at 35° F. to 45° F., is supplied to the barometric condenser making a vacuum of 29·6 in. mercury possible. Water at 102° F. circulates from the refrigerant condenser to supply heat of evaporation to the first effect. Water cooled to 40° F. by the refrigerant from the centrifugal compressor is circulated through the barometric condenser and barometric leg and later recirculated through the compressor by a pump taking suction from the cold well.

The warm water used for heat in the first effect is re-heated in the compression unit and completes the cycle by circulating through the No. 1 effect back through a pump to the compression unit. Heat balance is maintained by automatic introduction of cooling tower water into the system and ejection of excess water into the hot well. The evaporator is of the falling film type with juice pumped to the top of each unit and allowed to fall into the juice pot.

The capacity of the double-effect evaporator is 7,000 lb. per hour; the triple-effect unit handles 10,000 lb.

From the evaporator, the concentrated juice is pumped to the continuous blender to be combined with chilled fresh juice. The blend is then collected and chilled in tanks equipped with scraper-blade type agitators which keep the walls clean as well as mixing the contents of the tank.

Nine different sizes of cans are handled by two canning lines and sterilised by jets of steam and chlorinated water. They are dis-

After passing through the freezer, the canned juice is packed and conveyed to the cold storage department.

charged on to two conveyor belts moving at different speeds. In addition to freezing juice, the units are used as coolers for single strength and pasteurised concentrated orange juices. The former is cooled with 80° F. cooling tower water and the pasteurised concentrate with 50° F. chilled water from the centrifugal compressors.

From the freezers cans move to the brush cleaner and drier, whose capacity is 350 per minute.

The juice intended for pasteurisation is collected in tanks and pumped to the pasteuriser feed pumps, juice passing through the heating and cooling units then into the filling machine. The pasteurisers depend on high velocities through the tubes—at least 20 ft. per second—for efficiency and cleanliness. Pressure drop is correspondingly high—500 to 600 psi. It takes approximately two seconds for juice to be pasteurised.

Ammonia is used as the evaporative refrigerant and direct process refrigeration is produced by circulating the cold medium through the jackets of cold-wall juice storage tanks and through can freezers. An automatic temperature controller regulates circulation to each of the cold wall tanks.

Concentrated frozen juice is not heat sterilised because this treatment modifies the flavour, thus all process water is treated to ensure sterility.

New Books Register

Orders for any of the books listed below, or scientific and technical books in any language, may be placed with the Books Department, FOOD MANUFACTURE, *17, Stratford Place, London, W.1. A selected stock of books is carried and may be inspected at the above address. Prices given do not include postage.*

Brown, A. W. A. *Insect Control by Chemicals.* John Wiley and Sons, New York, and Chapman and Hall, London. Pp. 817. Illustrated. 100s.

Davy, J. R. *Industrial High Vacuum.* Sir Isaac Pitman and Sons, London. Pp. 243. Illustrated. 25s.

Feeding the Multitude

WITHIN the lifetime of some of our children the world's population, at present about 2,300 millions, may be expected to reach 4,000 millions. How are these people going to be fed?

F. Le Gros Clark and N. W. Pirie, in a new book* have assembled the opinions of a group of scientists, each an authority in his own field, which describe, in a manner that can be conveyed fully to the layman, the way in which knowledge and skill could be applied *now* to the production of more food.

The general trend of opinion expressed by the contributors is that if science be properly applied, world starvation is not imminent, but that we face it unless the masses of illiterate and unenlightened peasants and cultivators are transformed into alert, co-operative farmers, capable of exerting a measure of control over their own fecundity. This is tantamount to producing a breed of Malthusians who are also scientific agriculturalists.

The book begins with a historical study of the long controversy on the relation between human communities and their food resources. This first chapter by Mr. Le Gros Clark is an admirable dissertation on the course of Malthusian opinion and its influence on contemporary life. While there have been in the last century occasional recrudescences of Malthus, they were soon submerged in a fresh spurt of productivity. In more recent years, scientists have been cautious about accepting the views of those upon whom the mantle of Malthus has fallen. They often seem to make out a fairly strong case, yet, asks the author, might it not be merely another of the perennial scares? The first period of excitement came towards the close of the first world war, but it soon subsided. Wright, in 1923, possibly realised the source of anxiety when he said:

> The chief cause lies in the changing ratio of exchange between the manufactures of Europe and the raw products of other countries . . . the danger is that the unseen and little heeded pressure of population upon natural resources may retard or even prohibit the recovery of pre-war prosperity.

As Mr. Le Gros Clark says, this reads like a rehearsal for our modern perturbation and he goes on to comment upon the present-day phase of severe emotional conflict, through which he is confident we shall slowly struggle, after which we shall set ourselves to the task.

The subjects having been placed in their social setting, the basic problem of soil conservation is dealt with by Mr. G. V. Jacks, who gives a balanced scientific judgment upon the real meaning of erosion.

How far crop yields can be raised by improving soil fertility is dealt with in the next chapter, and in discussing this, Dr. F. Yates has drawn primarily upon the experience of Britain. In his contribution he discusses the part played by fertilisers in maintaining and increasing soil fertility, and the place of farm animals in intensive agricultural systems. Dr. Yates gives a remarkably clear idea of the methods of manuring for higher yields.

The protection from disease of growing crops is as necessary as the maintenance of soil fertility; in his contribution Mr. F. C. Bawden examines this, the second of the great factors that have led to a wastage of our food resources.

The contribution by Prof. S. C. Harland is concerned in the main with the part that has been, and may be, played by the plant breeder in giving us high yielding strains of edible crops and in converting non-edible plants into sources of human food. Prof. Harland is by way of being slightly pessimistic as is evidenced by the following quotation:

> As a biologist through rather a long life of research, teaching, and travel, I have been more struck by the stupid things that mankind has done, is doing, and will no doubt continue to do in the future, than by the slow capillary creep of the fluid of intelligence up the blotting paper of human inertia, cupidity, and ignorance. But it is in

* *Four Thousand Million Mouths.* Edited by F. Le Gros Clark, M.A., and N. W. Pirie, M.A., F.R.S. Pp. 222. Geoffrey Cumberlege, Oxford University Press. Price 12s. 6d.

some sense a hopeful sign when the Colonel Blimps all over the world start saying, "By Gad, sir, Malthus was right" (as indeed I think he was).

Leading from this is the contribution by Prof. H. D. Kay which discusses the improvement in milk supplies. He stresses the poverty of the less developed nations and declares that if progress in material betterment, not merely in improving nutritional standards but in reducing poverty in general, is to continue, there can be little doubt that along with the organised application of modern knowledge to agricultural practice, in an increasing number of countries, there must also be an equally conscious and deliberate dissemination and practice of modern methods for the peaceful control of the growth of populations. Otherwise, improved agricultural yields and better distribution can only stave off for a limited period the day on which unchecked human reproduction will end in war, famine, and the complete breakdown of society.

After milk comes a discussion on the conversion of vegetation and cereals into pig meat by Dr. J. Hammond, followed by Dr. C. E. Lucas's interesting note on fishing, while Drs. G. A. Reay and C. L. Cutting give the reasons why much investigation, planning, and organisation lies ahead before the world's fish is both produced and consumed so as to result in the maximum possible fulfilment of human needs.

Mr. N. W. Pirie devotes his space to the circumvention of waste, pointing out the possibility of the utilisation of the dry and withered stalks and straws and the still lush green leaves of vegetation. Green leaves have often been suggested as a source of raw material for protein production but no satisfactory process of separation has so far been published.

However, the recovery from crops of all the leaves that are at present wholly wasted in Britain would make only a small contribution to our food supply. But these leaves are merely a beginning. If processes of separation can be worked out successfully on them it will be worth while to grow crops especially for leaf protein production. The suggestion is that some crops, although obviously not wasted, are not being used to best advantage when they are fed to animals. If large scale protein extraction proves feasible other possibilities arise. A search could therefore start among the at present unused thousands of known plants for ones with a greater capacity to fix carbon and absorb nitrogen than those we are at present using.

The book is concluded by a chapter by Mr. A. L Bacharach and Mr. T. Crosbie-Walsh on the processing of foods, which mostly consists of a historical note of man's ingenuity in preparing and conserving food. They also emphasise the great part that the food scientist and technologist can play in improving the existing ways of the preparation of foods and of evolving methods which would enable those not naturally attractive to be presented to the consumer in a way which would appeal to him.

In the chapter describing the plan of the book we read:

> Our aim is a simple one. We realise that food supplies can be increased more rapidly than fecundity can be controlled; and it is for this reason that we have concentrated upon the increase of food supplies. But this alone is not enough; and there will be small gain, if in the next century we have a population of 4,000 millions as precariously fed as the present population and still expanding. There is little time in which to transform an illiterate peasantry into thoughtful and far-sighted men and women, capable of taking the future of their planet into their own hands. If we have demonstrated that scientists are prepared and anxious to play their part in the attempt, we shall have done what we set out to do.

There is no doubt but that this aim has been achieved in an extremely attractive and lucid manner.

Tuna Canning

STUDIES in the methods of canning tuna are included in a memorandum which has recently been issued by the Fishing Industry Research Institute in Cape Town. In this it is stated that the cleaning of fish at sea is impracticable, as leaching of the flesh is caused by ice, excessive bruising occurs during stowage and unloading, and there is some delay before freezing takes place.

Frozen fish must be thawed properly before they can be dressed and precooked. Failure to carry out this part of the processing operations results in perforations of the flesh owing to rapid melting of the ice crystals. The length of time required to thaw varies, depending on such factors as size of fish, method of thawing, and temperature.

Fish weighing from 5 to 10 lb. are said to thaw in water in 2 to 2½ hours, or in 4 hours if thawed in air at 80° F. The whole fish are generally given a good wash to remove all slime and extraneous matter before being cut open.

As soon as thawed (or on arrival at the factory if not frozen), the fish are eviscerated, followed by another wash of the belly cavity, as well as the mouth and gills, by means of a hose with a long fine nozzle, giving a heavy spray at a force of about 50 lb. per sq. in.

After the fish have been washed they are carefully inspected, all stale ones being discarded. Next the fish are placed in suitable containers, usually galvanised iron buckets, belly down for better drainage. Precautions are taken to place the fish straight in these containers in order to reduce cutting losses of the cooked meat. The baskets are stacked in the cookers on shelves or arranged on trolleys to fit the cookers. The temperature and time of this precook vary with different factories. Temperatures vary from 212° F. to 220° F. and the cooking time from 1½ to 9 hours. Jarvis considers the average temperature to be about 216° F. If cooked at 212° F. a soggy product may result.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Bakery Olympia 1951

Edmund B. Bennion, M.Sc.Tech., F.R.I.C.

After a lapse of thirteen years the 43rd International Bakers' and Confectioners' Exhibition was held again during October, not at its old home at the Agricultural Hall but in new surroundings at Olympia. With the greater amount of floor space thus available full scope was given for a better layout of stands all of which were of the open type permitting better viewing of the goods displayed and giving a spaciousness to the show which was most pleasing, not only to the visitors but also to the standholders themselves.

DISPLAYS in the Empire Hall were devoted mainly to bakers' raw materials exhibited by the sundriesmen, who are to be congratulated on the excellence of the many demonstrations which took place during the course of the Exhibition. One demonstration which aroused particular interest was that of caramel suitable for use in all bakery products. There must have been many visitors who had never realised the varieties of caramel available.

While many firms admitted that they had nothing to sell beyond the allocations of the Ministry of Food, the feeling was present that all were tuned up and waiting for the word "go" when controls might be released.

Machinery Exhibits

In the National Hall, the main displays were devoted to bakery machinery with particular emphasis on the latest types of ovens and machines suitable for bakeries of all sizes. The outstanding advance over pre-war years was perhaps the general streamlining of all machines with the object of making them easier to keep clean as well as improving their general appearance. Many of the machines were painted in various shades of cream and green instead of the old-fashioned battleship grey which was so widely used in pre-war days; this makes for cleanliness and attractiveness in bakery layout.

Notable also was the number of different travelling ovens available. Whereas in the pre-war days the choice of travelling ovens was limited to a few manufacturers, today there is a much greater range of excellent ovens of capacities to suit all sizes of trades.

Although there were many dough mixers on show, there were no new designs among them, but with dividers there were many notable additions as well as new designs of old well-tried models. All modern dividers are based on the suction principle so that the dough receives less harsh treatment but the advances made in all-purpose models suitable not only for dough pieces of all sizes, but also capable of taking pastes as well as dough, call for attention and consideration.

While the makers of the heavy duty types of divider for use with automatic plants may look askance at these machines, it would seem that the need of the small baker has been considered and every endeavour has been made to meet it. The final judgment cannot be given until the test of time has been applied, but the new machines look as though they would fulfill all the claims made for them.

Most of the moulders on show were based on fairly well accepted principles of design. Whereas the field for dough dividers may be more restricted than for moulders, ample provision is made for the requirements in both fields. Moulders for plain and fancy rolls were featured prominently by certain manufacturers and in these days such machines have an important place in the economics of production. With the narrow margin of profit on large bread all bakers must increasingly turn their attention to the smaller and more profitable lines, and such articles as rolls and small goods can be really profitable only if the labour cost for production is kept as low as possible by mechanised aids.

One notable feature of the Exhibition was the number of new machines devised for precision water control for breadmaking purposes. Thermostatic control of temperature combined with a water meter in place of weighing or measurement by volume promotes greater accuracy and control in the bakery.

Plant for Confectioners

On the confectionery side there was the usual range of cake mixing machines, among which was one destined for Turkey. This machine is more like a mixing machine for use in factories than bakeries, but no doubt it is to fulfill some special purpose. It will be interesting to see whether such a machine finds acceptance in bakeries in this country.

Another machine which aroused great attention was the cake depositor which could be operated by a girl and therefore was suitable for the smaller establishment. This represents the first attempt ever made in this country to meet the needs of the smaller producer and many orders were booked for it.

Improved models for cake slicing machines and many types of flour sifting and blending plants were on show. A wide range of pastry rolling machines was available and whereas not long ago delivery dates were uncertain, today a very reasonable delivery time was offered by most makers. Bread slicing and wrapping machines were also well featured and the newer models have a high degree of efficiency combined with output. Machines for tray washing were featured extensively and among those on view, some were quite suitable for moderate sized businesses.

All round the Exhibition there

was a more positive attitude, and delivery times of three to four months were quite general—a not unreasonable period in view of the raw material controls which exist today.

Trade Competitions

The number of entries for the trade competitions was not as high as in previous years. This, however, was only to be expected for many reasons. The Championship Confectionery Cup went to Hardings of Birmingham, and the Championship Shield for Bread to Mr. W. Newman of Brill. All the exhibits which gained awards merited them; some of the first class awards were up to pre-war standards but those following on were definitely behind. This, however, is not surprising for it requires superlative skill to produce first class work with inferior ingredients, particularly flour and fats. Long extraction flours can never give the brightness of appearance and bloom that short extraction flours will give. Neither can present-day fats or margarine produce the same results as could be obtained when selected oils and fats were used in the production of margarine and when butter and lard themselves were normal ingredients of flour confectionery.

The winning cakes in the decorated classes were superlative pieces of craftsmanship and the Exhibition has once again shown us what talent there is in the industry.

Special Displays

The special displays of Continental and British confectionery were outstanding in every way. The work of the Richmont School at Lucerne demonstrated the high quality of Swiss confectionery which was further supplemented by the displays of the Swiss bakery trade. Holland put up an excellent display of bread and confectionery and particularly of such articles as spiced ginger biscuits and cakes. France's display was characteristic of the many shapes and types of bread as well as pastries. Denmark produced an exhibit mainly of bread and Danish pastry since the richer and more elaborate types of confectionery are hardly known in that country.

The British display showed the influence of Continental craftsmen on our industry in the past and also the catholic nature of our tastes—accepting the best from all countries and evolving types and styles of our own. In all aspects of cake decoration, as always Great Britain excels.

With regard to general confectionery and pastry British craftsmen can produce articles equal to those produced by the Continental craftsmen provided they are given the raw materials, and the public is willing to pay for them.

Altogether the Exhibition can be considered a great success. It provided the necessary fillip to the industry and provided an excellent opportunity of showing what the trade can do.

The Chemical Senses

AN enlarged and revised edition of Mr. R. W. Moncrieff's most excellent book,* first published in 1944, has just been published. Minor errors in the first edition, which were noticeably few, have now disappeared, and this latest work bears all the marks of careful and painstaking revision.

The extent of the revision can be roughly gauged by the expansion of the volume from its previous 424 pages to 538 pages. Nearly all the chapters have benefited, and even those which have not gained in an actual addition of subjects discussed, have received a wider treatment of existing subject matter.

Six years is perhaps not long enough to expect great strides in so difficult a field of study as that surveyed by the author. There is, however, ample justification for an up-to-date review and appraisal of the advances that have been made, and one very welcome addition to the chapter on the Theories of Odour is Mr. Moncrieff's personal views, without which no such subject could be deemed complete.

Briefly, the main additions to the subjects discussed are The Causes of Perspiration Odours and The Properties of Activated Carbon as a Deodoriser. In the chapter on Sensation, two valuable additions are an explanation of the Berger Rhythm and the development of the idea of a Pattern of Sensation. Chapter four, entitled Olfaction has, understandably, been enlarged nearly twofold by the inclusion of Selective Fatigue, Parosmia, Olfactory Characteristics of the Catfish and Hedgehog, and the Pattern of Smell. Passing on to chapter twelve, entitled Theories of Odour, Mr. Moncrieff has added, with his own views, those recently propounded by Beck and Miles and also McCord and Witheridge. Other subjects added to the two remaining chapters are: Green Leafy Odours, Ambergris, Choice of Flavour, Colour and Flavour, and finally The Measurement of Spoilage of Food.

This book offers the most up-to-date and systematic collection of data covering those animal senses which are characterised by chemical stimulation. Throughout, the author has drawn extensively from previously published works, and and detailed references are given in the actual text. He is well known as a writer of scientific literature of outstanding ability, and he has succeeded in creating, from a mass of complex technical data, a very readable book for those wishing to extend their knowledge of this fascinating subject, and a highly efficient reference book for the busy research worker.

One feature of the book which, in the reviewer's opinion, deserves particular commendation is the inclusion of a most useful glossary and excellent author and subject indexes.—G. K.-J.

* *The Chemical Senses.* By R. W. Moncrieff, B.Sc., F.R.I.C. Second edition. Pp. 538. Leonard Hill Limited, London, W.1. Price 21s. 9d. post free.

Our Contemporaries

Articles published in our associated journals of the Leonard Hill Group this month include the following:

"Air Transport of Agricultural Produce in Australia" and a preview of the forthcoming Smithfield Show (*World Crops*).

"Analysis of Chlorophyll" (*Manufacturing Chemist*).

The Protecta-Tin Process

THE black staining of the inside of food cans is a familiar phenomenon, in fact so familiar that it is not looked upon with any suspicion by the majority of consumers. Nevertheless, a considerable amount of work has been done in order to produce a spotless can.

The Protecta-Tin treatment for tinplate was devised by Dr. E. S. Hedges at the Tin Research Institute prior to the war, and in 1940, Dr. R. Kerr, a member of his staff at that time, published the details. The treatment involves exposing the tinplate for a few seconds to the action of a nearly boiling solution of caustic soda containing a powerful oxidant, sodium dichromate. The alkali removes the grease and helps the oxidant to make effective contact with the tinplate. It is then rinsed in hot water and dried.

Tests have been made by many of the world's leading canners, and there is general agreement that the treatment does what is claimed for it. For example:

1. Cans of peas, kidney soup, or corned beef, when opened are seen to be bright and shiny and devoid of internal stains.

2. The onset of noticeable exterior rusting is delayed greatly; untreated cans may be red with rust, while treated cans show only slight tendencies to rusting at the rims.

These benefits would surely be worth having if they did not cost too much.

The main difficulty is that cans are bulky, and the treating, rinsing, and drying of them in vast numbers calls for the installation of large and costly equipment. There would be a fuel bill for heating the tanks and the drier. The chemicals are moderately costly, and since they are used up or gradually lost as rinsings they need to be continually replenished.

It is cheaper to apply the Protecta-Tin treatment to the flat sheets of tinplate before they are made into cans. A criticism of cans made from the treated tinplate was that one or two showed traces of the familiar blackening or browning along thin lines scored by the can-making tools, but, even so, such cans still looked much better than untreated cans.

Another modification of the treatment is to apply it to filled and sealed cans during or immediately following the canning process. The cans will not rust readily, but there is no stain prevention inside. In some cases this is an adequate treatment because many foods do not stain tinplate.

According to an article in *Tin* (September, 1951), generally speaking, canners do not want Protecta-Tin. They admit some advantages, but decry the cost factor. If they treat empty cans, inside and out, the process is certainly more costly than if they treat the outsides only. Could the can makers provide treated cans? They would have to buy the equipment, and they are not yet confident that canners will think it worth while to pay the extra cost. It is certain the can maker would be involved in expense, but it is not yet certain whether he could recoup it. For the same reason the can maker cannot buy treated tinplate. The tinplate maker as yet sees no object in installing treatment tanks, and there has been little pressure from his customer, the can maker.

Whether or not the past ten years have been unfavourable for the development of the Protecta-Tin process is an open question. Canned foods have been in great demand throughout these years, and it may be that the treatment would be more widely adopted if the selling problem for canned foods were not so easy.

The canners cannot be accused of being backward in the adoption of new ideas, but there are admittedly problems, technical and economic, in putting the Protecta-Tin process to work. It does seem, nevertheless, that there should be a future for this useful addition to canning technology.

Automatic Control

AN excellent book* for those who have already become acquainted with basic control theory, and are anxious to widen their knowledge, has been recently published. The title referring to "fundamentals" might be misleading for the student or for the practical plant engineer who did not have the benefit of either university education or its equivalent. They might regard it as being beyond their capacity to digest, and what seems to be fundamental for a specialised instrument expert, such as the author certainly is, may be beyond many people who use control instruments in industry, but have no mathematical background.

Bearing in mind the above limitations, the author has certainly put a great amount of work and thought into this book, which can be thoroughly recommended to those who wish to have the elaborate control theory presented in a concise form. The ways in which mathematics have been employed are often original and straight to the point. The examples for applied control theory are well chosen, but from the reader's point of view should be more numerous, although this would probably have increased the volume of this book beyond the intended scope.

The first chapter deals with the control system, and the second explains the various modes of control. Chapter 3 is headed "Transfer Stages," and brings the reader right into vector analysis and analogue equations. Section 8 of this chapter, entitled "Plant Characteristics" deserves some extension to become more profitable to the users of process controllers in practice.

Control system equations and changes of process loads and of variable are dealt with in chapters 4 and 5. The numerous graphs are of great value in illustrating the mathematical formulae dealing with process character-

* *Fundamentals of Automatic Control.* By G. H. Farrington, B.Sc., A.C.G.I. Pp. 285+xii. Chapman and Hall, London. Price 30s. net.

istics in relation to controller characteristics. Sequence control, cascade control, and position control receive due consideration. Chapter 6, "Transmission Lines and Distributed Constants," deals with methods of transmitting control impulses electrically, pneumatically, and hydraulically.

The mathematical treatment of plant characteristics in chapter 7 is original, and should be most useful for readers having to solve control problems in chemical or food plants, employing a single closed loop or control cycle. Multi-loop problems, where engineered control is required, are explained in chapter 8. This chapter seems to be too brief to give all the information required by the practical user of inherently related control systems. A few practical examples in the next edition might be included with advantage, even when this has to be done in a non-mathematical way owing to the fact that a mathematical elaboration would probably by far overstep the purpose of the book. Chapter 9 is headed "Control Discontinuities," and deals with the effect of very heavy process disturbances on control systems which have to work near the end of their range, or disturbances caused by change of the desired value (set point).

The tenth chapter is entitled "Plant Analysis" but it seems somewhat illogical to find regulating units dealt with in Section 4 of this chapter, instead of in the following one, headed "Analysis of Controlling Units." This chapter is very concisely presented, as is the last chapter, entitled "Control Selection and Adjustment."

Summing up, it can be safely said that the author is to be congratulated for his enrichment of the much too sparsely available literature on automatic control theory.—L. W.

Sanitation and Public Health

An interesting and instructive book* on the practice of sanitation has recently made its appearance. It appeals particularly to the reviewer because the authors are engineers and write from the standpoint of engineers. As such, they claim that an initial sanitary survey should be under the direction of a person of broad training and experience and that a sanitary engineer should direct the work, although earlier they make the very wise statement that the fundamental precepts of sanitation will be found in the sciences of bacteriology, biology, entomology, epidemiology, chemistry, and physics.

When so many sciences are involved, it would be natural to expect that a member of the "administrative" service would be placed in charge of the survey in this country. It might be agreed that a sanitary engineer should be placed in charge of the implementation of a survey, but not with the authors' basic claim.

If the reviewer had to appoint a member of any one profession to take charge of the initial survey, he would suggest that it should be a medical man with a diploma in public health; but, in general, the man in charge of such a survey should, it is felt, be a man who, by his training, experience, and ability, is best able to bring into correct perspective the reports and views of his assistants irrespective of his initial profession.

Because of their wide outlook, the views of the authors are most stimulating, and their claim that the book has been developed as a guide to environmental sanitation for the training of physicians, nurses, sanitarians, and students of sanitary engineering is modest.

The volume should be found useful to the scientific staffs of all large food factories because the material is so comprehensive; it covers in one volume the principles of disinfection, food sanitation and public health, milk and milk products, water supplies, disposal of sewage, the control of steam pollution, the disposal of refuse of solid wastes, ventilation, swimming pools, environmental sanitation, insect and rodent control, and administrative procedure.

In order to deal with all this mass of material in the space of about 400 pages, the authors have adopted an incisive style, which brings home the essential points they wish to make. Many of their phrases might be considered as truisms, but they are often penned very effectively, as for instance, "organic matter combines with chlorine, whether it be in the form of bacteria or residues of milk or particles of stable dust."

When dealing with the milking of cows it is suggested that the cleanliness of the milking stools will indicate the general standards of cleanliness and hygiene of the dairy—plain common sense such as is seldom met with in books. The chemical and biological aspects are not quite complete and the authors quote figures for the use of quaternary compounds in sterilising detergency, which are typical of much of the published advertising matter for these substances, quoting figures for bacterial growth or destruction without naming the quaternary compounds used or the "good detergents" added to them for the test and they tend to think of the use of cresols as the only phenols for disinfectant purposes.

The authors are forced to the conclusion that the disposal of garbage and refuse is one of the disadvantages of modern civilisation and make no attempt to deal with the possibilities of thermophilic fermentation or of desiccation of rubbish for subsequent distribution on and fertilisation of the soil. After perusing a volume of this type, the chief regret is that so much energy is spent converting valuable waste materials into harmless products, to be discharged into rivers or seas, when the land is crying out for their proper utilisation as fertilisers. Surely there should be some better means of keeping waste on the land than by uncontrolled dumps, which form breeding grounds for rodents, and insect and other pests.—T. McL.

* *The Practice of Sanitation*. By Edward S. Hopkins and Francis B. Elder. Pp. vii+423. Williams and Wilkins, Baltimore. Price $7.50.

Second International Canning Convention

IT was in January 1935 that the French Intertrade Committee on Canned Foods agreed to organise the First International Congress on Canned Foods and to endeavour on this occasion to set up a permanent international organisation, the Trade Associations of food canners having promised their support. The Congress was held in Paris in October 1937, at which twenty countries were represented.

Six months later, in May 1938, it was resolved to institute the Comité International Permanent de la Conserve (C.I.P.C.) of which Mr. R. V. Manaut became President. This body was to act as a liaison agent between all those who, the world over, were concerned with the food canning industry. Messrs. H. Cheftel and P. Peissi were appointed as recorders.

Pre-war Work of the C.I.P.C.

During the short pre-war life of the C.I.P.C., Mr. H. Cheftel, with the assistance of his colleagues, all of whom were scientists and technologists, had been able to classify and complete the bibliography of several canned food producing countries, *i.e.* France, Germany, Italy, Norway, the United Kingdom, the U.S.A., and to observe that certain questions had still been insufficiently examined and were worthy of the special attention of the C.I.P.C. These questions concerned the digestibility of canned foods, the bacteriology of deliberately non-sterile canned foods, and the influence of sterilisation on organoleptic qualities. This last question was reserved, being deemed to be too closely related to the peculiarities of national products.

On standardisation and labelling of cans, after more than a year's investigation, analysis, and synthesis, Mr. P. Peissi had drawn up a report which, but for the events which then took place, might have permitted of a study of the various points involved, based on a considerable mass of documents.

Unfortunately, the second world war destroyed all the hopes built up by three years' preparation and two years' work carried on in an atmosphere of goodwill born of the study of problems of mutual interest.

It was only seven years later, in 1946, that an attempt was made to reconstitute the C.I.P.C. as a result of the impulse given by its President, Mr. R. V. Manaut, assisted by Messrs. H. Cheftel and P. Peissi, the custodians of the documents which had given concrete form to the earlier work.

Mr. R. V. Manaut opens the Congress. On his left are Mr. P. Peissi and Mr. Materne. On his right is Mr. Prothin.

A renewal of activity was made possible by the contacts established either directly with the former members of the C.I.P.C., or through the French Commercial Attachés in foreign countries, with the industrial organisations abroad.

Preparations for the Second Congress

During October 1946, the C.I.P.C. met again in Paris; the session was attended by the delegations of Belgium, Denmark, France, Italy, Morocco, Norway, the Netherlands, Switzerland, the United Kingdom, and by the International Tin Research and Development Council.

This meeting was more than a mere renewal of contacts, for in addition to permitting of a necessary survey of the pre-war work accomplished, it afforded an opportunity to complete the programme drawn up eight years earlier. It considered, for instance, the preparation of a report to the 2nd International Congress, dealing with recent progress made in equipment and methods of production of the various canned food industries. It also comprised a study of the various national legislations and of the methods of analysis applied in the different countries in the field of preserved foods, with a view to instituting, as regards the latter question, a possible programme for unification. The study of the digestibility of canned foods, of the bacteriology of deliberately non-sterile preserved foods, and of the standardisation of containers was still included in the programme.

Since 1946 the study of these problems has made regular progress, thanks to half-yearly meetings held in 1947 in Paris and Parma, in 1948 in Paris and Marrakech, in 1949 in Paris and Brussels, and in 1950 in Cambridge and Lisbon.

The international scope of the questions studied by the C.I.P.C. resulted in contacts being established with other international bodies, such as the United Nations Food and Agriculture Or-

ganisation (F.A.O.) or the International Organisation for Standardisation (I.S.O.).

Aims of the C.I.P.C.

The C.I.P.C. has always worked in complete harmony with its founder's intentions. Being an association not for profit, it endeavours to collect data from all over the world dealing with all aspects of the preservation of food. On behalf of the high contracting parties it examines, suggests, and carries out all measures tending to overcome any obstacles to increasing the consumption of canned foods throughout the world.

As certain of the work it has undertaken is nearing completion, it was incumbent on the C.I.P.C., as anticipated when it was created, to organise a 2nd International Congress on Canned Foods for the purpose of publicising the results of its activities, defining the present position of the food canning industry, its means and its production, and, by determining the new and important questions with which it is faced, deciding on its future programme of work.

The Second Congress gets Under Way

The Second Congress, at which 400 delegates, representing 23 countries, attended, was held in Paris on October 16-19, 1951.

The real business of the Congress was initiated in the afternoon when, under the chairmanship of Prof. Ch. Richet, Membre de l'Académie Nationale de Médecine (France), a paper was read by Prof. A. G. van Veen, Acting Director, Nutrition Division, F.A.O. This was followed by two papers on the nutritional quality of canned foods. Prof. C. G. King, Scientific Director of the Nutrition Foundation, U.S.A., discussed the importance and significance of University and industry research on the nutritional quality of canned foods, and was followed by Dr. L. E. Clifcorn, Manager, Fundamental Research, Continental Can Company, U.S.A., who reviewed research on nutrient retention during canning.

A paper on the digestibility of canned foods by Mr. M. Fontaine, Professeur de Physiologie, Muséum National d'histoire Naturelle, and Mrs. Cannepin, Ing. I.P.C. (France), concluded the afternoon's business.

Dr. Ing. F. Emanuele, Mr. W. Leonard Hill, and Mr. H. Cheftel at the Congress.

Technical Developments in Canning

The second morning was occupied by a number of reports on "Technical Developments of the Canning Industries in Various Countries during the last 14 years," under the chairmanship of Mr. H. Cheftel, Directeur, Laboratoire de Recherches, Ets. J. J. Carnaud et Forges de Basse-Indre (France).

Contributors to these reports were Dr. C. Olin Ball, Research Specialist in Food Technology, Rutgers University, U.S.A.; Mr. F. Bramsnaes, Direktor, Fiskeriministeriets Forsogslaboratorium (Denmark); Mr. S. Larsen, Margarine Compagniet (Denmark); Mr. G. G. Knock, Research Division, The Metal Box Company of South Africa Ltd. (Union of South Africa); Mr. H. Parreira, Engenheiro Chefe, Serviços Industriais, Instituto Português de Conservas de Peixe (Portugal); Mr. J. G. Huntley, Deputy Director, Research Department, The Metal Box Co., Ltd. (United Kingdom); Pharmacien Colonel Meesemaecker, Directeur tech-

Great interest in the papers was evinced by the delegates.

Examining a ham pack at the factory of Geo. Foucault at Kremun-Bicetre.

nique, Fédération des Industries de la Conserve au Maroc (Morocco); Mr. J. Durocher, Directeur, and Mr. J. Roskis, Chef de Service, Institut National de la Conserve (France); and Dr. Ch. E. Norton, Chief of Research, Southern Can Company Pty., Ltd. (Australia).

General reports on technical developments concerning the canning of fish were presented by Mr. M. Jul, Chief, Technology Branch, Fisheries Division, F.A.O.; and those concerning the canning of meat products, by Dr. J. P. K. van der Steur, Chemical Department, Lever Brothers and Unilever (Netherlands).

In the afternoon developments in the various countries were described by Dr. R. H. Lueck, General Manager of Research, American Can Company, and Dr. K. W. Brighton, Supervisor, Technical Publication Section, General Research Laboratory, American Can Company, U.S.A.

Other contributions were by Dr. P. H. Lefebvre, Directeur, Section technique, Institut National pour l'Amélioration des Conserves de Légumes (Belgium); Mr. F. Hirst, Director, and Mr. W. B. Adam, Deputy Director, Fruit and Vegetable Preservation Research Station, Campden (United Kingdom); Miss M. Olliver and Mr. W. E. Rhodes, Chivers and Sons Ltd. (United Kingdom); Dr. W. Pilnik, Director of Research, Central Citrus Products Research Laboratory, and Prof. M. A. Joslyn (State of Israel); Mr. F. Jakobsen, Director, Research Department Plätmanufaktur (Sweden); Mr. R. Hamard, Sous-Directeur, Ets. J. J. Carnaud et Forges de Basse-Indre (Tunisia); and Mr. F. Neau, Ingénieur, Ets. J. J. Carnaud et Forges de Basse-Indre (Algeria).

General reports on technical developments concerning the canning of fruit were presented by Dr. W. B. Adam, Deputy Director, Fruit and Vegetable Preservation Research Station, University of Bristol, U.K., and those concerning the canning of vegetables by Mr. J. Durocher, Directeur, Institut National de la Conserve (France).

Food Legislation

On the morning of the third day food legislation occupied the attention of the delegates. The chairman, Mr. C. A. Adams, C.B.E., B.Sc., F.R.I.C., Barrister-at-Law, U.K., introduced Mr. C. H. Bloedorn, Manager of Technical Services, Continental Overseas Corporation, U.S.A., who discussed the aspects of U.S.A. legislation on canned foods. Mr. Bloedorn was followed by Dr. C. L. Hinton, of the British Food Manufacturing Industries Research Association, U.K., who made comparison between the food laws of various countries.

Economics and Bacteriology

In the afternoon there were two distinct sessions, one devoted to economics and the other one to the bacteriology of deliberately non-sterile canned foods.

In the economics section, the subject was the cost and availability of canned foods compared with home-cooked foods in various countries, and the contributors were Prof. W. A. Krehl, Ph.D., Yale Nutrition Laboratory, Department of Physiological Chemistry, Yale University School of Medicine, U.S.A., Mr. G. Jumel, Conseiller technique, Conseil supérieur de la Conserve (France), Dr. G. Borgstrom, Direktor, Swenska Institutet för Konserveringforskning, and Mrs. C. Boalt, Fil. Mag., Direktor, Hemmens Forskninginstitut (Sweden); Mr. F. Bramsnaes, Direktor, Fiskeriministeriets Forsogslaboratorium (Denmark), and Mr. P. H. Lefebvre, Directeur, Section technique, Institut National pour l'Amélioration des Conserves de Légumes (Belgium). The chairman was Mr. Mayolle, Vice-President, Conseil national du Patronat français (France).

The scientific section was presided over by Prof. M. Macheboeuf, Chef de Service, Institut Pasteur (France). The following contributions on the bacteriology of deliberately non-sterile canned foods were made by Miss V. Aschehoug, Chief of the Bacteriology Department, Hermetikkindustriens Laboratorium (Norway); Messrs. H. Cheftel, Directeur, Laboratoire de Recherches, Ets. J. J. Carnaud et Forges de Basse-Indre, and J. Durocher, Directeur, Institut National de la Conserve (France); Mr. Charles Lepierre, former Professor at the High Technical Institute, former Director of the laboratory of the Instituto Português de Conservas de Peixe, and Mr. J. M. Mercier-Marques, Engenheiro químico (Portugal); and Mr. R. J. But-

tiaux, Chef de Service, Institut Pasteur de Lille (France).

Dr. C. H. Lea, of Low Temperature Research Station, U.K., discussed non-enzymatic browning.

Discussion on Packing

The last day of the Congress was taken up with the subject of packing, Mr. V. J. Dreschfeld, Sales Manager, Food Cans, The Metal Box Co., Ltd., U.K., presiding. Tinplate was discussed by Dr. E. S. Hedges, Deputy Director, Director of Research, Tin Research Institute, U.K., while developments in tinplate and tinplate container manufacture in the U.S.A. during the last 12 years were the subjects of papers by Dr. R. H. Lueck, General Manager of Research, American Can Company, and Dr. K. W. Brighton, Supervisor, Technical Publication Section, General Research Laboratory, American Can Company, U.S.A.

Tin cans and aluminium cans were discussed by Mr. F. Jakobsen, Director, Research Department, Plätmanufaktur (Sweden), and Mr. T. Taarland, Hermetikkindustriens Laboratorium (Norway), respectively. Mr. G. Weston, Technical Director, British Standards Institution, Secretariat of Technical Committee No. 52 of the International Organisation for Standardisation (I.S.O.), spoke on the standardisation of cans.

In the last session, Mr. R. V. Manaut gave a report on the Permanent International Committee on Canned Foods and discussed its past, present, and future. Its work was also reported upon by Mr. H. Cheftel and Mr. P. Peissi.

Discussion Sessions

Following every paper there was lively discussion and questioning by the delegates, many of them quoting from their own experiences and so adding importantly to the value of the Congress. A shorthand note of these discussions was taken and will be the basis of a printed report which will give the text of the original papers. It is hoped that this volume will be published at the end of the year, and it should prove to be a valuable comprehensive guide to the present stage of development of every section of the canned foods industry.

The Congress ended with resolutions and conclusions arrived at during the proceedings.

During the Congress an interesting visit was made by a number of the delegates to the pig slaughterhouses of Geo. Foucault at Kremun-Bicetre.

Social Functions

Among the outstanding social events of the week was the reception at the home of the President of the C.I.P.C., Mr. R. V. Manaut, at which were present the delegates and their ladies.

A memorable evening was also spent in the flood-lighted Greek Sculpture Rooms at the Louvre Museum.

The final event was the banquet given at the Hotel George V attended by the delegates and their ladies and a number of distinguished guests.

In addition to the social activities already recorded, a series of tours was enjoyed by the ladies. These included Versailles and Malmaison, Montmartre, and a presentation of the collections of the great Paris dressmakers.

Arsenic in Foods

In February, 1950, the Minister of Food approved for publication a report of the Food Standards Committee's Metallic Contamination Sub-Committee (Food Manufacture, **25**, 4, 1950), proposing the introduction of statutory limits for arsenic in foods and beverages; he has now approved for publication a supplementary report of the Sub-Committee in which some modification of the original proposals is recommended as a result of a review of representations, supported in some cases by oral evidence, from trade and other interests.

The limits previously recommended for ready-to-drink beverages, *i.e.* 0·1 p.p.m., and for all other foods, whether solid or liquid, not otherwise specified, *i.e.* 1·0 p.p.m., are unchanged.

Regard has been had to the contention that the arsenic content of beverage bases (*i.e.* substances used as the basis for the preparation of beverages) is not directly related to the total solids content—particularly in the case of products used in the preparation of soft drinks. The item "beverage base" has, therefore, been deleted from the schedule (paragraph 17 of the original report), and for "concentrates" used in the preparation of soft drinks a limit of 0·5 is recommended. The general limit of 0·1 p.p.m. for ready-to-drink beverages applies to all beverages except cider and soft drinks intended for consumption after dilution, for which the limits are 0·2 and 0·5 p.p.m. respectively.

A limit of 5 p.p.m. on dry colouring matter is recommended only for cochineal and other natural dyes, "synthetic" colours being required to conform to the general limit.

The difficulty in restricting the arsenic content of hop concentrates, finings, and clearing agents to the limit of 2 p.p.m. recommended for dried hops has been recognised by increasing to 5 p.p.m. the limit for these substances. It should be emphasised that beer or other beverage, in the preparation of which these ingredients are used, are still required to conform to the general limit for ready-to-drink beverages.

A reduction in the limit from 5 p.p.m. to 2 p.p.m. is recommended for dried liquorice extract.

In addition the Sub-Committee recommend that dried chicory and pectin be included in the schedule with limits of 4 p.p.m. and 2 p.p.m. respectively; and that "phosphatic constituents of raising powders" should more specifically be described as "phosphates of ammonia, calcium, and sodium."

All limits quoted are expressed in terms of the element (As); for conversion into arsenious oxide (As_2O_3) the factor is 1·32.

Food Controls in Great Britain

C. G. Daubney, M.Sc., F.R.I.C.

PART IV

In his fourth instalment of this series of articles, the author outlines the labelling and purity of food Orders and the Public Health Regulations.

LABELLING OF FOOD ORDER

(S.I. 1950 No. 1061; S.I. 1951 No. 462)

"FOOD" means any article used as food or drink for human consumption and includes any substance which is intended for use in the composition or preparation of food, any flavouring, sweetening matter or condiment, and any colouring matter intended for use in food, and an article shall not be deemed not to be food by reason only that it is also capable of being used as a medicine.

"Intoxicating Liquor" means spirits, wine, beer, cider, perry, and sweets and any fermented, distilled, or spirituous liquor which cannot be lawfully sold without an excise licence.

The Order provides that, subject to certain exemptions, prepacked food must bear a label giving:

(i) the name and address of the packer or labeller or other approved person;
(ii) a registered trade mark;
(iii) the name of the food;

or in the case of a food with two or more ingredients:

(iv) the common or usual name (if any) of the food and of each ingredient. Unless the proportion of each ingredient is stated, the ingredients must be given in the order of the proportions used, that in the greatest proportion being mentioned first.

Special provisions are made for the labelling of intoxicating liquors.

As to vitamins and minerals, any claim or suggestion as to the presence of vitamins or minerals must be substantiated by a quantitative declaration of the amount present.

Peas which have been processed before canning or freezing must be appropriately labelled.

A solution of acetic acid containing more than 15 per cent. w/v. of acetic acid must be specially labelled if prepacked for sale by a person other than a pharmacist or authorised seller of poisons.

No food may be sold which is labelled as to indicate that it possesses tonic properties by reason only that it contains (i) alcohol; (ii) sugars or other carbohydrates; (iii) protein or substances prepared from the hydrolysis of protein; or (iv) caffeine or other purine derivatives.

In each instance, the number of the principal Order and of the latest amendment (if any) is given.

FLUORINE IN FOOD

(S.R. & O. 1947 No. 1134)

The Order prohibits the manufacture or sale of certain articles of food which contain more than a specified proportion of fluorine as given below.

Article of Food	*Fluorine content*
1. Calcium acid phosphate, sodium acid pyrophosphate, or any other acidic phosphate	300 p.p.m.
2. Any article of food (not included in 3 and 4 below) containing calcium acid phosphate, sodium acid phosphate, or any other acidic phosphate and intended for use in the composition or preparation of food	300 p.p.m. of the (mentioned) phosphate present.
3. Baking powders, including golden raising powder	(*a*) 100 p.p.m. where such article yields not less than 15 per cent. available CO_2. (*b*) 133 p.p.m. where such article yields not less than 15 per cent. available CO_2. 8 p.p.m. of the article of food.
4. Self-raising flour or any similar mixture (not included in 3 above) containing a farinaceous substance and as acidic phosphate	

MINERAL OIL IN FOOD

(S.I. 1949 No. 614)

"Mineral Oil" means any hydrocarbon product, whether liquid, semi-liquid or solid, derived from any substance of mineral origin and includes liquid paraffins, white oils, petroleum jellies, and hard paraffins.

Mineral oil may not be used in the composition or preparation of any article of food intended for human consumption, and no article of food containing any mineral oil may be sold for human consumption.

These prohibitions do not apply to:

(i) Dried fruit (*i.e.* prunes, currants, sultanas, or raisins) containing not more than 1 per cent. by weight of mineral oil.
(ii) Food containing mineral oil due to the presence of dried fruit containing mineral oil, provided the mineral oil is not more than 1 per cent. of the dried fruit content of the food.
(iii) Food containing not more than 0·2 per cent. mineral oil due to the use of the oil as a lubricant or greasing agent on some surface in which the food necessarily came in contact during preparation.

A.—THE PUBLIC HEALTH (PRESERVATIVES, ETC., IN FOOD) REGULATIONS (ARTICLE 4)

(S.R. & O. 1925 No. 775, S.I. 1948 No. 1118)

"Preservative" means any substance which is capable of inhibiting, retarding, or arresting the process of fermentation, acidification, or other decomposition of food or of masking any of the evidences of putrefaction; but does not include NaCl, $NaNO_3$, KNO_3, sugars, lactic acid, acetic acid or vinegar, glycerine, alcohol or potable spirits, herbs, hop extract, spices, and essential oils used for flavouring purposes or any substance added to food by the process of curing known as smoking.

"Cream" means that portion of milk rich in milk-fat which has been separated by skimming or otherwise and is intended for human consumption.

"Thickening Substance" means sucrate of lime, gelatine, starch paste, or any other substance which, when added to cream, is capable of increasing the vis-

cosity but does not include cane or beet sugar.

"Sulphur Dioxide" includes sulphites. Sulphites shall be calculated as SO_2.

"Benzoic Acid" includes benzoates, and benzoates shall be calculated as C_6H_5COOH.

These Regulations prohibit the sale of:

(i) Food containing added preservatives (with certain exceptions).
(ii) Food containing certain colouring matters.
(iii) Cream containing any thickeners.

The exceptions to (i) are specified in the first Schedule of the regulations where the permitted quantity of sulphur dioxide or benzoic acid (as the case may be) is given in parts per million, for particular foodstuffs.

Certain relaxations are also in force in the case of meat containing SO_2; margarine and bacon containing borax, dehydrated vegetables containing SO_2, and jam with more than the prescribed amount of SO_2.

The use of sodium or potassium nitrite is permitted under licence in the curing brine or pickle for bacon production. Cooked pickled meat (other than bacon and ham) may contain nitrite up to 200 p.p.m. as sodium nitrite.

These regulations apply both to home produced and imported foodstuffs. Where certain foods, *viz.* sausages, sausage meat, coffee extract, pickles and sauces, and (where the proportion of benzoic acid exceeds 600 p.p.m.) grape juice and wine contain permitted preservatives, the food must bear a label to that effect. Further, any article sold as a preservative must bear a label stating the percentage of SO_2 (or benzoic acid) present.

The Margarine (Addition of Borax) Order, 1940 (S.R. & O. 1940 No. 982) permits, under licence, the manufacture of margarine containing borax, and the Bacon (Addition of Borax) Order, 1940 (S.R. & O. 1940 No. 547) permits under licence the addition of borax to bacon and ham.

The colouring matters which may not be added to articles of food are:

(*a*) Metallic colouring matters, being compounds of any of the following metals: Sb, As, Cd, Cr, Cu, Hg, Pb, Zn.
(*b*) Gamboge.
(*c*) Coal tar colours known as Picric Acid, Victoria Yellow, Manchester Yellow, Aurantia, and Aurine.

B.—PUBLIC HEALTH (CONDENSED MILK) REGULATIONS

(S.R. & O. 1923 No. 509, S.I. 1948 No. 1122)

"Condensed Milk" means milk or skimmed milk which has been concentrated by the removal of part of its water, whether with or without addition of sugar and includes the article commonly known as "evaporated milk" but does not include dried milk or milk powder. "Skimmed milk" includes separated or machine-skimmed milk.

The Regulations prohibit the sale of condensed milk, whether home produced or imported, intended for human consumption unless:

1. It is contained in a tin or other receptacle which is labelled in the manner prescribed.
2. It contains not less than the appropriate percentage of milk fat and milk solids as specified.

These provisions do not apply to condensed milk for export or if in receptacles of over 5 lb. gross weight. If supplied for restaurant use, the labelling requirements are waived.

Condensed skimmed milk must be labelled as "unfit for babies" in the prescribed manner.

Every tin or receptacle containing condensed milk must bear a label giving the following information.

1. Full cream milk (unsweetened):

> CONDENSED FULL CREAM MILK, UNSWEETENED.
> THIS TIN CONTAINS THE EQUIVALENT OF (*a*) PINTS OF MILK

2. Full cream milk (sweetened):

> CONDENSED FULL CREAM MILK, SWEETENED.
> THIS TIN CONTAINS THE EQUIVALENT OF (*a*) PINTS OF MILK, WITH SUGAR ADDED

3. Skimmed milk (unsweetened):

> CONDENSED MACHINE - SKIMMED MILK [OR CONDENSED SKIMMED MILK], UNSWEETENED.
> UNFIT FOR BABIES
> THIS TIN CONTAINS THE EQUIVALENT OF (*a*) PINTS OF SKIMMED MILK

4. Skimmed milk (sweetened):

> CONDENSED MACHINE - SKIMMED MILK [OR CONDENSED SKIMMED MILK], SWEETENED.
> UNFIT FOR BABIES
> THIS TIN CONTAINS THE EQUIVALENT OF (*a*) PINTS OF SKIMMED MILK, WITH SUGAR ADDED

The equivalent in pints must be given in words and figures, any fraction being expressed as eighths, quarters, or a half and the size and arrangement of the printing is prescribed.

For the purpose of these Regulations, milk means, for the Full Cream product, milk with not less than 12·4 per cent. milk solids including not less than 3·6 per cent. milk fat and skimmed milk means milk which contains not less than 9 per cent. milk solids other than milk fat.

The Regulations also specify other permitted wording on the label.

The Second Schedule of the Regulations gives the required percentages of milk fat and milk solids for various types of condensed milks (*see below*).

In the Condensed Milk (Canned) Maximum Prices Order, 1940 (S.R. & O. 1940, Nos. 1622 and 1895) Special Full Cream Sweetened and Special Full Cream Unsweetened Condensed Milks are defined as containing not less than 10 per cent. butterfat.

C.—PUBLIC HEALTH (DRIED MILK) REGULATIONS

(S.R. & O. 1923 No. 1323; S.I. 1948 No. 1123)

"Dried Milk" means milk, partly skimmed milk, or skimmed

Type	*% Milk fat*	*% of all milk solids including fat*
Full Cream, Unsweetened ..	9·0	31·0
Full Cream, Sweetened ..	9·0	31·0
Skimmed, Unsweetened ..	—	20·0
Skimmed, Sweetened ..	—	26·0

milk, which has been concentrated to the form of a powder or solid by removal of water.

These Regulations prohibit the sale of dried milk for human consumption unless the dried milk:

1. Is contained in a tin or other receptacle which is labelled in the prescribed manner.
2. Contains the following percentages of milk fat:

Dried Full Cream	..	..	26
.. $\frac{3}{4}$	..	..	20
.. $\frac{1}{2}$	..	..	14
.. $\frac{1}{4}$	..	..	8

Dried skimmed milk must be labelled as "unfit for babies."

Labelling

The Regulations provide that the label shall state (i) in the case of dried full cream milk:

> DRIED FULL CREAM MILK.
> THIS TIN CONTAINS THE EQUIVALENT OF (*a*) PINTS OF MILK

(ii) in the case of partly skimmed milk:

> DRIED PARTLY SKIMMED MILK
> [(*b*) CREAM]
> SHOULD NOT BE USED FOR BABIES EXCEPT UNDER MEDICAL ADVICE
> THIS TIN CONTAINS THE EQUIVALENT OF (*a*) PINTS OF (*b*) CREAM MILK

Where (*b*) can be $\frac{3}{4}$, $\frac{1}{2}$, or $\frac{1}{4}$

(iii) in the case of skimmed milk (*i.e.* less than 8 per cent. milk fat):

> DRIED MACHINE-SKIMMED MILK.
> (OR DRIED SKIMMED MILK)
> UNFIT FOR BABIES
> THIS TIN CONTAINS THE EQUIVALENT OF (*a*) PINTS OF SKIMMED MILK

In the case of dried milk to which sugar or other substance has been added, the label shall bear additional words in the appropriate form:

1. "Sweetened" if only sugar has been added.
2. "Modified" if only a constituent of milk has been added.
3. "Compounded" in every other case.

and the words "with (*c*) added" shall be added to the last sentence in each case, (*c*) specifying the substance or substances added.

For the purposes of these Regulations the following percentages of milk fat and milk solids are to apply to the various equivalents of "milk":

Milk	*Milk fat*	*Milk solids including fat*
Full Cream	3·6	12·4
$\frac{3}{4}$ Cream	2·7	11·6
$\frac{1}{2}$ Cream	1·8	10·8
$\frac{1}{4}$ Cream	0·9	9·9

D.—PUBLIC HEALTH (ICE CREAM) (HEAT TREATMENT, ETC.) REGULATIONS

(S.R. & O. 1947 No. 612; S.I. 1948 No. 819)

"Ice Cream" includes water ices and any article, under whatever description it is sold which is so similar to ice cream as to constitute a substitute therefor.

"Ingredients" includes sugar and dried egg but does not include colouring or flavouring materials or fruits, nuts, chocolate, and similar substances.

"Complete Cold Mix" means a product which is capable of manufacture into ice cream with the addition of water only, is sent out by the manufacturer in airtight containers, and has been made by evaporating a liquid mixture which has already been submitted to heat treatment comparable with that prescribed in these Regulations.

The Regulations require that a complete cold mix which is reconstituted by the addition of wholesome drinking water must be frozen to ice cream within one hour of being made.

In any other case, after the ingredients have been mixed together, the mix is to be subjected to heat treatment adequate to destroy any pathogenic micro-organisms which may be present and to be cooled to not more than 45° F. within 1½ hours and so maintained until the freezing process is begun.

The ice cream shall not be sold unless either:

(i) it has been kept at a temperature not exceeding 28° F. since it was frozen.
(ii) if its temperature has risen above 28° F. at any time since it was frozen, it has again been subjected to heat treatment and again frozen.

It is required that ice cream and all apparatus used in its manufacture are kept properly protected from contamination.

(*To be continued*)

Botany, Nutrition, and Technology

THE sub-title of a recent book* on medical botany reads: "a handbook for medical men and all who are concerned with the use of plants: nutritionists, dietitians, pharmacists, and veterinarians."

In the first section the different classes of food are briefly described, after which there are forty-three pages on the mineral ash content, mainly from the nutritional aspect, and the functions of soil minerals in the development of the plant. In the next sixteen pages the vitamins are treated cursorily; for instance, folic acid is given two lines: "Folic acid was first isolated from the leaves of spinach, and the name refers to this source—foliage."

Some rather casual details of storage, processing, and cooking occupy another short chapter.

The main section of the book is entitled "Vegetable Foodstuffs Considered in Detail," and the different foodstuffs are arranged in order. The system depends, jointly, on three sets of criteria—the dietetic characteristics of the foodstuffs, the botanical nature of the plant part concerned, and the position the producing plant has been assigned in systematic botany. In some cases one of these sets of criteria is more dominant and in other cases another set comes forward.

As a primary grouping, the foodstuffs produced by plants belonging to the Phanerogams are separated from those derived from Cryptogams. Within the class so constituted from the flowering plants there are two sections: in one group are placed all those foodstuffs in which the whole plant or a part of it is taken for food and where the incidence of flowering (fertilisation) is not necessary. In the other group come all those plant parts developed as a result of fertilisation or its de-

* *Medical Botany*. By Alexander Nelson, Ph.D., D.Sc., F.R.S.E. Pp. xi+544. E. and S. Livingstone, Edinburgh. Price 30s. net.

velopmental equivalent — parthenogenesis.

As an example of the treatment of the subjects as a whole, the chapter on wheat may be taken. It starts off with terms employed in and about the wheat milling industry, and gives short paragraphs describing the different kinds of wheat such as Hard Wheat, Soft Wheat, etc. Cleaning, tempering, and milling are then shortly discussed, and, after some information about the carbohydrates, fats, proteins, minerals, and vitamins, some remarks on special breads follow, the section ending with a page on macaroni.

Another section is devoted to vegetable drugs, poisons, stimulants, and other plant products of pharmaceutical interest, and the final section deals with medical problems on which plant science has a direct impact.

The whole book, while being chock-full of information, appears to the reviewer to pass from different aspects of the same subject in a rather haphazard way.

However, it is easy to read and will no doubt prove useful to those who require a quick survey of the subjects dealt with.

British Viticulture

WRITTEN in response to a demand from many people for simple but precise knowledge on the subject of outdoor grape growing and wine making in England, a recently published booklet* describes the appropriate steps to be taken to ensure a healthy vine and to engage in the art of wine making.

In the small space of 32 pages which the author has allowed herself, she has managed to cram in a large amount of information which will be of value to the amateur.

A short section is devoted to the preparation of wine from other fruits, and also vegetables, and a calendar for the vintner and viticulturist indicates the different tasks to be carried out month by month in the vineyard and winery.

* *Grape Growing and Wine Making.* By S. M. Tritton, M.P.S., F.R.I.C. Pp. 32. Grey Owl Research Laboratories, Glos. Price 5s.

Fruit Preservation

IT is pleasing to note that a third edition* of Morris's *Principles of Fruit Preservation* has been called for. This book has been the standard textbook for many years, covering all the methods of fruit preservation; its continued acceptance by the technicians in the industry is a sufficient guide to its usefulness both in the laboratory and in the factory.

Dr. Morris, in his preface to this new edition, explains that only minor alterations have been made in the text of the previous one, so that the scope of a reviewer is considerably limited. Cold storage and freezing received much more attention in the latest edition, which is certainly well worth possessing if only for the detailed description of the principles and practices involved in these two quickly developing methods of processing.

Criticism, however, can be directed towards the lack of up-to-date references. There is a gap of five years between the two editions; in looking through the bibliography at the end of each chapter, the reader looks almost in vain for any references after 1945 —the date of the last edition. It would appear as if no publications of any value or interest had appeared from that time, and while we must remember that Dr. Morris to some extent covers himself in his preface against the charge of leaving out too much, it would have been useful to have had some references to work carried out during that period.

The work of his colleague, Dr. Gane, on freezing concentration is not mentioned; on page 59, German authorities are quoted as stating that weak citric acid is equally effective as ascorbic acid for the inhibition of oxidase activity causing browning of fruits. This is an important principle, for they say that *p*H is the controlling factor. The reference to the original papers on such an important contribution to our knowledge on the subject would have been very useful.

During the period between the two editions, very considerable improvements have been made in the vacuum concentration of fruit juices, and the Americans have developed in a short period of time some remarkable methods for concentrating the "ester" fractions. In 1950, the reviewer edited and published a comprehensive bulletin on *Recent Advances in Fruit Juice Production* which, in view of its wide scope, should have been noted in the list of references.

It is hoped that when the call comes for a further edition, Dr. Morris will be in a position to amend his draft to include both details and references to the more important features of research work on these various subjects, so that his book can be regarded as being completely up-to-date.—V. L. S. C.

* *Principles of Fruit Preservation.* By T. N. Morris, M.A. Third edition. Pp. 206+xiii. Chapman and Hall, London. Price 21s. net.

Technology for Butchers

IT was in 1946 that we reviewed the first edition of Mr. Frank Gerrard's admirable textbook for butchers, and a token of its acceptation is the new edition* that has been called for.

Primarily written for the student as a textbook, and for his preceptor as an *aide memoire*, this book will appeal to a large readership, including chemists concerned with animal foods.

Mr. Gerrard writes as a practical man, and in doing so does not take two bites at a cherry. He plunges into the different parts of his subject without circumlocution at the onset of each chapter. His presentation is, for the most part, admirable in that it gives a balanced idea of principles, as well as practice.

As he says, book learning can never replace practical experience, but the period of apprenticeship can be considerably reduced by intelligent study of this book.

* *Meat Technology.* By Frank Gerrard, M.Inst.M., M.Inst.R., M.R.San.I. Second edition. Pp. 309+vi. Leonard Hill Limited, London. Price 15s. net.

The Manufacture of Maize Starch

J. A. Radley, M.Sc., F.R.I.C.

PART II

The Function of Sulphur Dioxide

AS already stated, it is necessary to limit microbiological activity during steeping, and sulphur dioxide is, almost without exception, the most favoured of the various agents suggested or used, owing to low cost, effective biological action, and its influence on the physical state of the system.

The control and use of sulphur dioxide in wet milling have been discussed by Killinger.[15] From 0·02 to 0·03 per cent. of free sulphur dioxide, or sulphurous acid, effectively inhibits the action of many organisms, and its efficiency is markedly increased with increased temperature from 30° to 50° C. A considerable portion of the added sulphur dioxide reacts to form bisulphite and to form addition compounds with amino groups, ketoses,[16] and with carbohydrates, possibly through the aldehyde group, and these combined forms are very much less effective sterilising agents.

The determination of the total sulphur dioxide in process water does not, therefore, give results indicative of its antiseptic power, and it is desirable to determine only the "free" sulphur dioxide. It appears that its efficiency is not necessarily attributable to the *p*H required to maintain it in the "free" state.

Cox, McMasters, and Hilbert[6] have investigated the function of sulphur dioxide as a steeping agent, and found that starch is embedded in and tightly held by a birefringent protein network which swells and tends to form tiny globules of hydrated protein on steeping. The birefringence is gradually lost, and the protein tends to disperse leaving a residue that collapses against the cell walls, when the starch granules are removed, as a mass devoid of the original network structure. Sulphur dioxide greatly accelerates this process. They found it impossible to steep maize satisfactorily by soaking the grain in distilled water at 49° C. for 24 hours, but that sulphur dioxide accelerated the steeping action in proportion to the amount added.

The addition of acetic acid and hydrochloric acid gave poor results, but on the other hand steeping with 0·2 per cent. lactic acid produced results similar to the use of sulphur dioxide as judged by protein disintegration and softening action at similar concentrations. A combination of lactic acid and sulphur dioxide for steeping increased the softening action of the latter. These workers attribute the specific action of sulphur dioxide to its reducing properties, rather than to its acidity, inasmuch as sulphites exert a dispersing effect on some proteins, and reducing agents activate papainases[17] which may also play a part in the general action.

Disadvantages of Sulphur Dioxide

The use of sulphur dioxide has one major drawback in that the gas volatilises from the acid steeping water and its corrosive action on equipment and on the factory structure is very marked. The acid in the steepwater tends to modify the starch, which shows a significant loss in potential paste viscosity.

These disadvantages of sulphur dioxide have caused workers to study other steeping agents, particularly those which are less acidic.

Sodium benzoate[18] in the presence of some sulphur dioxide, organic halogen compounds[19] such as monochlorobenzene and o-chlorotoluene, formaldehyde,[20] and ozone,[21] have all been patented for this purpose.

Recently Wagner[22, 23] directed attention to the use of caustic alkalis for steeping, which was advocated by Stratton[24] in 1858—indeed, Kingsford's[25] alkaline process was used for many years until it was displaced by the more efficient sulphur dioxide process.

A Simple Steeping Method

The most elementary method of steeping consists of covering the grain in a partially filled wooden vat with warm water containing a steeping agent such as sulphur dioxide. The temperature is maintained at about 50° C. for 40 to 48 hours, after which the steep liquor is drained from the softened grain, which is then milled.

This method requires relatively large amounts of water for efficient steeping, but does possess certain advantages over countercurrent or diffusion cell methods, which are designed to obtain a more efficient removal of soluble material for the use of a given quantity of steeping liquor.

Kerr[3] has pointed out that in this method the germicide can be added at the place where it will be most effective, *i.e.* at the points of entry of the incoming maize and the process water where both the grain and the water are exposed to the highest concentration of sulphur dioxide used in this system. A smaller addition of germicide is required, therefore, in this system to limit microbiological activity to a given level than in countercurrent systems wherein the incoming grain meets the lowest concentration of sulphur dioxide.

Single Vat Steeping

In single vat steeping using sulphur dioxide, lower acid concentrations prevail with, consequently, less likelihood of degradation of the starch, which will have a relatively high paste viscosity. The *p*H of the steepwater is not necessarily the same as the *p*H of the absorbed water in the grains or of the water layers next to the starch granules. The grain contains naturally occurring buf-

fering agents, *e.g.* phosphates and phytin, which reduce the *p*H of the absorbed water. Since they are soluble in warm acidulated water, they are readily removed when excessive amounts of steeping liquor are used, especially in a process involving the countercurrent flow principle. When this happens, the grain gradually assumes the *p*H of the steeping medium, but in single vat steeping a large differential between the *p*H of the maize and the *p*H of the steeping medium is readily maintained.

After steeping, the maize is coarsely ground in degerminating mills.

Countercurrent Steeping

Because of the highly efficient use made of water in the countercurrent system, most of the modern mills operate on this principle, effecting great economies in the use of water. Fresh water is used in the last stages of washing the refined starch, and this liquor is then used for flushing the starch from the sedimentation tables. After having been used in turn in the various operations in the mill house, the liquor is pumped to an absorption tower where, after taking up the desired amount of sulphur dioxide, it is pumped to the steeps.

Countercurrent steeping is often carried out using a series of about 12 to 14 wooden vats. Dry grain enters a steep at one end of this series, and is met and steeped in liquor that has progressed in stages through all the other steeps in turn. At the other end, the last steep contains maize which has been steeped in liquor of progressively increasing freshness, and this is emptied by running the steeped grain to the mills. The water is removed from all steeps, in turn, and advanced to the next steep in the direction of the one which was last filled with dry grain.

New steeping liquor is added to the next steep from this end of the series, and this vat then becomes the next to provide fully steeped grain for milling. After the liquor has been used on the dry grain entering the cycle, it is pumped to evaporators to recover the soluble solids.

Since a steepful of liquor is discarded at every countercurrent step or change, and as the freshly added grain also absorbs quite a volume of liquor in the early stages of steeping, two or more advances of water throughout the system are usually required in order to fill the steep containing the fresh grain, and the next one to it. The method involves a very large amount of labour and supervision, and the discontinuous pumping of steeping liquor leads to some grain being left uncovered for an appreciable part of the steeping time.

A large loss of any volatile steeping agent occurs during the many pumping operations, increasing costs because of this loss, corroding plant, and adversely affecting the comfort and health of the workers, so that the installation and maintenance of a ventilating system is required. Some of these disadvantages are avoided by working the countercurrent in a totally enclosed system, each closed steep being connected to the next by pipe from the bottom of one to the top of the next steep, the liquor passing through the system by virtue of a hydrostatic head. Countercurrent extraction is extremely efficient in removing soluble material.

The two systems are equally effective in the separation of starch and maintaining its quality; both give a measurable loss of potential paste viscosity due to the rapid shift of the *p*H within the grain to a value approaching that of the steeping liquor,[2] owing to the removal of buffering agents. After 40 to 48 hours in steepwater at *p*H 3·5 to 3·8 with approximately 0·2 per cent. sulphur dioxide content, the *p*H of the grain falls from about 6·4 to about 4·0 and the steepwater has a *p*H of 4·0 to 4·2 and contains about 0·04 per cent. sulphur dioxide. About 6 per cent. of the weight of the grain appears in the steepwater, from which it is recovered by evaporation and constitutes a valuable adjunct to animal feedingstuffs.

Unless the time and temperature of steeping and the volume and sulphur dioxide content of the steeping liquor are adjusted to optimum values most suited to any particular grain processed, poor separations in milling may result. As previously mentioned, certain

As the slurry moves through the germ separators, the hulls and coarse grits settle out.

ions improve the sedimentation of starch from gluten water, and these substances may be leached out in excessive amounts. Maize starch prepared in the laboratory with precautions against possible degradation has a paste consistency equal to about 125 by Scott Test, sometimes higher; and that made by the single vat steeping system, using a steeping liquor of the composition specified above at 125° F. for 44 hours has a value of about 115 by Scott Test. Using the same liquor for countercurrent steeping gives a starch with a value of about 90.

In one process the fresh steeping liquor is first run over a steep of dry maize first and then pumped to the last steep, which is the normal point of entry in the countercurrent system. By this procedure the temperature of maize entering the system is raised more quickly; maximum concentration of sulphur dioxide is available to act upon organisms both in the process water used and on the incoming maize and therefore a lower initial sulphur dioxide concentration may be used. In another modification, sulphur dioxide is introduced at several places in the series of steeps.

Kerr[2] has proposed another arrangement wherein only 3 steeps are used in series. In this last steep, the maize is treated for about one to two hours with gluten overflow water containing 0·08 per cent. sulphur dioxide and the corn is then milled. All this water passes to the second steep for a period of 22 hours, after which a portion is discarded and the balance is sent to the first steep which is charged with dry maize and then topped up with gluten overflow water containing sulphur dioxide to raise the sulphur dioxide content of the steeping liquor to 0·12 per cent. After steeping, all this liquor is discarded.

Microbiological activity is very well controlled for a minimal addition of sulphur dioxide, and as the *p*H of the grain is maintained above 4·5 up to the last washing stage, the starch obtained from this process has a paste viscosity of about 110 by Scott test.

Milling and Separation

After steeping, the maize is coarsely ground in the so-called degerminating mills, the primary object at this stage being to free the grain from the germ, if possible, without breaking or crushing the latter. A suitable machine for this purpose is the Fuss mill, which consists of a bronze-lined chamber housing two upright metal plates 36 in. in diameter and studded with metal teeth. One plate revolves at about 900 r.p.m. while the other is stationary.

Process water is added to the maize passing to the Fuss mill and, after grinding, additional process water containing starch in suspension is added to the slurry to assist in pumping it to the top end of the germ separator vats and to adjust its density to about 8° to 10·5° Bé., which causes the germs to float.

Germ Separation

In the germ separators, which are V-shaped vessels about 4 ft. wide, 6 ft. high, and 10 to 15 ft. long, the hulls and coarse grits settle out as the slurry moves through the vat and are discharged through a take off in the bottom of the vat. The floating germs overflow into a weir box at the exit end of the separator, the migration of the germs usually being assisted by a series of paddle wheels or drag sweep paddles.

The coarse material containing the hulls and a small percentage of germs and coarse grits is freed from the finer particles and liquor by passing over rotating copper sieves or "reels," and re-ground in a second set of degerminating mills. The grist is combined with the liquors from the reels, the density adjusted to 8° to 10° Bé., and the suspension again passed through a germ separator.

The germs are washed free from starch on a series of reels, dewatered in squeeze presses and driers, and are then treated either in heated hydraulic presses or by solvent extraction to recover the oil content.

The degerminated underflow from the separators is sieved to separate the liquor and very fine material which, after further sieving through silk sieves, may be partly recycled in the germ separating process, or it may pass to the starch tables or centrifuges. The coarse grist, containing hulls, fibre, and particles of the endo-

sperm, is finely ground in buhrstone mills, after which the starch and the gluten in the endosperm are in a very finely divided state and remain in suspension when the hulls and fibre are removed by sieving.

Since the presence of relatively small amounts of fibre interferes with the separation of the starch from gluten in the sedimenting or centrifuging operations, its efficient removal must be ensured by the use of fine silk shaker sieves.

The slurry of starch and gluten is now adjusted to the desired density for separation of the starch, since, even using a countercurrent system throughout the mill, the density of the liquors is often less than that required in some systems. In such cases, the liquors are partially dewatered by passage over Grinco or string filters. These are continuous, revolving drum, suction filters equipped with a series of strings which pass around the drum and thence to a roller at some distance so that the layer of filter cake is readily lifted from the drum by the strings. Other suitable methods of concentration may, of course, be practised.

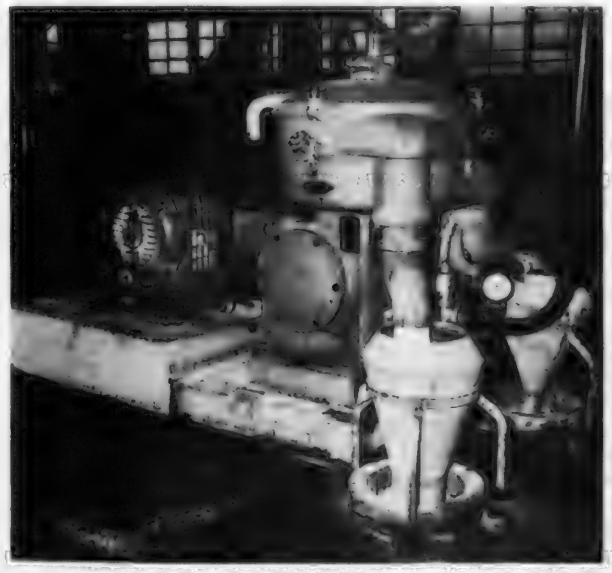
The most elementary method for separating starch from dispersed gluten is by sedimentation in a vat for several hours, drawing off the supernatant liquor containing the gluten, resuspension of the settled starch in fresh water, and resettling. The efficiency obtained in separating starch from protein by this method is poor.

The germs are washed free from starch on a series of reels.

A starch with a rather too high protein content can be obtained by using a continuous gravity separator in which the slurry of starch and gluten is fed continuously into the top of a cone-shaped vat and the starch drawn off as a concentrated slurry at the bottom.

Tabling Process

"Tabling" is now almost universally employed to separate starch and gluten. The dimensions of the table, its inclination, the rate of flow, and the results obtained are, to a large extent, determined by the characteristics of the slurry of starch and gluten employed, of which an important feature is the density. Densities of 6° Bé. became common with the introduction of the system of reusing all process waters either in the same or another cycle of operations, no liquors being dis-



The degerminated underflow from the separators is sieved.

Fine silk shaker sieves remove the small amounts of fibre.

carded to the sewer. Even with liquors of this density, however, about 30 gallons of water per bushel of maize are used in the mill and table house. Since only about 10 gallons of this water can be used for steeping, about 20 gallons of liquid per bushel of maize processed have to be reused. These liquors contain substantial quantities of water soluble and fermentable maize solids, and their re-use introduces difficulties in the production of starch and gluten of high quality free from degradation products caused by microbiological or enzyme action.

If substantially higher densities are used, *e.g.* 12° to 13° Bé., only 10 to 12 gallons of liquor per bushel of grain are needed in the mill house, and after use here the bulk of this liquor can be absorbed in the steeping process.[26]

All other conditions being equal, the lower the density used, the more easily is starch sedimented from gluten. Thus if it is desired to increase the liquor density a careful study and adjustment of other variables of the process is required in order to maintain and increase quality standards and high yield of starch. According to Kerr[2] some of the important variables which influence the efficiency of separation and quality of product are (*a*) physical state of the gluten, (*b*) *p*H of the slurry, (*c*) ionic strength of the liquid, (*d*) temperature of the slurry, (*e*) the rate of flow of the liquors delivered to the table head, and (*f*) the characteristics of the table.

A satisfactory range of acidity for tabling is between *p*H 3·8 and 4·2. Separations become more difficult if the *p*H is outside this range, *e.g.* *p*H 3·0 or *p*H 5·0. A total concentration of the electrolytes common to mill liquors corresponding to about 50 to 150 grains of ash per gallon of liquid appears to be sufficient. With lower values, the starch, particularly the smallest granules, settles more slowly, so that at certain rates of flow on the tables this part of the starch passes off with the gluten. Reducing the rate of flow sufficiently to allow the starch to separate also allows the codeposition of undesirably high amounts of gluten.

Highly ionised acids or bases are able to increase the sedimentation rate of starch, an effect observed for potato starch by Wiegel.[27, 28] Therefore, at a very low *p*H, *e.g.* 1·5, or at high *p*H, such as 10 to 11, starch may be tabled because the favourable influence of increased ionic strength contributed by the acid or base counterbalances the adverse effect of a change of *p*H away from the optimum range. Working at the highest temperature practicable (75° to 100° F.) increases the efficiency of table separation since an increase in temperature reduces the apparent density of the table liquor.

Obviously, too fast a rate of flow on the tables will lead to some starch being carried off with the gluten fraction, and at too slow a rate gluten will sediment with starch. The range of rates of flow at which starch is obtained at the highest purity and yield is very narrow and must be determined for each set of operating conditions, and when found, is maintained at the preferred value by controlling delivery of the liquor to the tables.[29, 30]

The rate at which the mill starch moves down a table in unit volumes per unit of table length per minute is determined by the delivery at the table head in unit volumes per minute, the pitch or elevation of the bed, and other characteristics of the bed, such as its width. If the width is relatively large compared to the delivery rate, so as to permit a zigzag course, then the time required for a given volume of liquor to move from one end of the table to the other may be considerably more than anticipated. Most of the starch settles out on the first third of the table's length, and thus the actual pitch of the bed over which the table liquors run does not remain constant during the three to four hour period normally employed for sedimenting the starch. Therefore, tabling is carried out until the speed of flow becomes such that loss of starch in the effluent reaches an undesirable level.

After the desired amount of starch has been deposited on the table, the flow of mill liquor is stopped, a period for draining is given, and the last of the gluten is flushed from the surface of the starch with a small water hose. Frequently a squeegee is employed to facilitate this operation, and for this reason the mixture of gluten and the rather appreciable quantity of starch which is removed at this stage is often referred to as "squeegee starch." Finally, the starch is removed by flushing with high pressure water jets[31] using water from the filters to which the flushed starch liquor is now passed for dewatering.

A discussion of some of the problems involved in the re-use and re-cycling of process waters will be found in various patents.[32-39]

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(To be continued)

British Cake and Biscuit Industry

That freedom from price control of both flour confectionery and biscuits would be in the best public interests was one of the points stressed in the report of the Executive Committee of the British Cake and Biscuit Association for the year ended May 31, 1951, of which this is an extract. Price freedom would permit of goods in wider variety and the interplay of free competition would keep prices down and improve quality. The theory of a strict price control is false unless the goods so controlled are in short supply. In the case of both biscuits and flour confectionery, production and demand are very close to parity and price control is no longer essential. Bulk buying ranks in equal importance to price control in the true economy of the industry.

THE case of the British Cake and Biscuit Association against the Ministry of Food is that flour is neither of the extraction required nor is it of the quality desirable for the manufacturing of the products in which we take such pride. Dried fruit is often dirty and of poor quality. Nails are found in blended fats and filth in dried milk. These factors combine to add to costs by reason of the necessary cleansing and close examination prior to using the ingredients. It is the belief of the Association that they could all be avoided if it were possible to purchase ingredients on a free ingredient market where seller and buyer took pride in the preparation of the goods that form the raw materials.

Flour Confectionery

The unavailing efforts of the Committee to obtain freedom from the price control of flour confectionery or, as an alternative, freedom to produce the light weight fancy articles so much in demand by the public, which are not possible to produce under the ceiling price of 3s. per lb., have continued right through the year under review.

There is also the further complication of unprecedented increases in the prices of raw and ancillary materials to be considered. These have completely nullified the increased ceiling price for flour confectionery, permitted by the amendment to the Flour Confectionery (Control and Maximum Prices) Order, 1946, issued in January, 1950.

As a result of various representations, it was announced on June 13, 1951, that as from June 24 the changes proposed to the Flour Confectionery (Control and Maximum Prices) Order, 1946, and its amendments would be:

(*a*) An increase of 6d. (from 3s. to 3s. 6d.) per lb. net in the maximum price of flour confectionery where the combined content of fat, sugar, and dry egg solids (or any two of them) amounts to 45 per cent. or more of the total weight, or where, for every pound of cake, the ingredients cost 1s. or more.

(*b*) A new maximum price of 6s. per lb. net for flour confectionery containing less than 15 per cent., by weight of farinaceous materials.

(*c*) An increase of 3d. (from 1s. 9d. to 2s.) per lb. net in the maximum price of all other flour confectionery except uncooked pastry.

(*d*) An increase of 7d. (from 1s. to 1s. 7d.) per lb. net in the maximum price of uncooked pastry.

It has also been decided to discontinue the licensing of manufacturers of flour confectionery.

This new Order gives a great measure of relief to a hard-pressed industry. The Regulations regarding Wedding Cakes remain, *i.e.* if a wedding cake containing less than 15 per cent. of flour cannot be sold at 6s. per lb., it may still be manufactured under licence as heretofore.

A further matter upon which representations have been made by the Committee to the Ministry of Food is a request for more sugar for the flour confectionery trade. In a letter addressed to the Director of Bakery in December, 1950, it was pointed out that notwithstanding an allocation of eggs amounting to 100 per cent. of datum usage, the output of sponge goods is severely restricted by lack of sugar, and experience shows that the demand for sponge goods exceeds the supply.

Apart from Swiss Rolls, jam sandwiches, etc., the small sponge goods which were so popular in pre-war days have disappeared from the shops. If additional sugar were available, manufacturers belonging to the Association would undoubtedly reintroduce this type of cake for retail marketing.

The letter then pointed out to the Director how severe had been the drop in the wholesale production of slab and size cakes. Increased supplies of sugar would at once enable manufacturers to increase their output and provide cake at the lowest possible price. The letter concluded by calling the attention of the Director to the point that, throughout the war and post-war years, wholesale cake manufacturers have had a bad time owing to the fact that their point of allocation has been tied to that of the baking industry in general, and to the fact that owing to their wide distribution they had to maintain a standard quality of cake.

Thus, in the case of manufacturers a drop in the percentage point of allocation meant a loss in tonnage of production, and it was in the hope that some part of the serious loss sustained may be made good that an appeal was made to obtain more sugar for the industry.

Biscuits

A point which has probably never been quite clarified is that the biscuit industry is quite distinct from the flour confectionery industry. Every "A" licence

holder is compelled to be a member of the Cake and Biscuit Alliance, thus the Alliance represents the entire biscuit manufacturing trade. It is for this reason that the Committee's views on the problems arising in the biscuit industry are always expressed through the Council of the Alliance and unilateral action is never taken. Therefore, the full story of biscuit negotiations throughout the year under review can be told only in the Report of the Alliance, but the Committee has been active in expressing its views on biscuit problems and in trying to find a way out of the difficulties that face the manufacturers it represents.

The Price Problem

At the very forefront of these difficulties is the price problem. In the case of flour confectionery there is an overall ceiling and within the limits of that ceiling makers can charge such prices as they care to fix. In the case of biscuits, however, established manufacturers are limited in the price they can now obtain by the price at which they sold the same kind of product in pre-war days, when a combination of factors enabled many of them to sell their products at comparatively low prices.

There was then a wide variation in ingredients, production, labour, and distribution costs, but today these variations have been ironed out. All manufacturers pay the same prices for ingredients, the labour situation is considerably altered, and there is now little variation between manufacturers on output "per man per ton." The pattern of distribution has altered with a consequent levelling out of costs. These factors combined now militate badly against those whose pre-war datum prices for biscuits were very low.

The Committee has given very careful consideration to some overall method by which manufacturers suffering under these restrictions can be helped. It is true that under the present price control system a manufacturer can obtain an increase in his prices by making appropriate application, submitting his trading accounts, and proving his case. These applications have to be made and proved on behalf of each individual line, and it is felt that after nearly ten years of this irksome and somewhat laborious form of control, some simpler system of price control can be evolved. There can be no hope of supplanting a well-established system except by the introduction of a still better system and the Committee is working on this point.

General advances in prices throughout the year have been of a character that has covered ingredient costs only and has not permitted any addition to the profit margin of the manufacturer.

The increases in the prices of ingredients and ancillary materials have also affected the biscuit industry. The Committee has been active in its endeavours to obtain a further general advance in the prices of all biscuits that will go some way towards absorbing these additional costs.

Work of the B.B.I.R.A.

The British Baking Industries Research Association, which is doing such a splendid job of work and has already established itself as an authority in the baking industry, from time to time pays the Committee the compliment of consultation. The Committee approved a memorandum prepared by the B.B.I.R.A. for the guidance of Sanitary Inspectors in their contacts with bakers, giving in reasonably simple form some of the aims that the baking industry itself has in mind and those particular points on which the advice of the sanitarians will be most helpful.

The need for a measure of standardisation of equipment and ingredients used in the baking industries has also been discussed at length with Dr. J. B. M. Coppock, Director of the B.B.I.R.A. The Committee is not enthusiastic on this subject, but it has emphatically expressed the view that if and where standardisation appears to be desirable it can best be carried into effect by the B.B.I.R.A. in consultation with the baking industries' Associations.

Productivity Team Visits U.S.

After long consideration, the Committee came to the conclusion that a team representative of biscuit and wholesale cake manufacturers could beneficially be sent to the U.S.A. Other Associations and the Trade Unions were invited to co-operate, and the consequent nominations have enabled the Selection Committee to form a team representative of a wide cross-section of the industry as a whole and conforming in general to the pattern required by the Anglo-American Council.

The following is the composition of the team which sailed on August 10:

Philip H. Bailey, T.D. (Thomas Parkinson Ltd.).

Sydney G. Bailey, M.B.E. (Secretary) (The British Cake and Biscuit Association).

W. T. D. Clark, M.A., A.M.I.Mech.E. (Serpells).

Charles Frears, M.A., J.P. (Leader) (Frears).

P. Z. Henderson (Meredith and Drew).

Miss A. B. Horan, J.P. (National Union of General and Municipal Workers).

A. R. Land (Elkes Biscuits).

J. Spence Piggott (Inglis and Co.).

S. W. Seymour (Huntley and Palmers).

W. H. Smith, F.C.S., A.R.I.C. (C. H. Elkes and Sons).

A. G. Snood (Peek, Frean and Co.).

R. N. Spark, B.Com. (Ralph Spark and Sons).

W. Wilson, A.M.I.Mech.E. (Alfred Hughes and Sons).

Miss Nora Wynne, O.B.E., B.A., J.P. (Carr and Co.).

Weights and Measures

The Report of the Committee on Weights and Measures Legislation was issued in May, 1950. The recommendations affecting Association members are that prepacked biscuits, except biscuits sold by the packet or by the piece at a price not exceeding 3d. per pack or piece, should bear an indication of minimum net weight or measure; that any varieties of flour confectionery should not be required to be sold by weight only; and that Christmas puddings should be made up only in

specified weights, and that there was a justifiable exemption for uncanned puddings which are made to provide a quantity suitable for one person.

It is probable that a consolidated Weights and Measures Act, based upon the recommendations of the Committee, will ultimately be brought before Parliament; meantime an Order came into force on July 1, 1950, which permits prepacked biscuits to be sold without any marking as to weight if the weight is less than 4 oz.

Factory Lighting

The Committee being convinced that good lighting aids efficiency in the factory and also that, where it could be carried out, it would aid the sales of the retailer by enhancing display, decided to make investigations into the most suitable form of light sources. The Lighting Service Bureau of the Electric Lamp Manufacturers' Association of Great Britain gave every possible co-operation and placed the full resources of the Bureau at the disposal of the Committee.

As a result, the Committee was able to issue a Report in December, 1950, giving its recommendations on the most suitable lighting for manufacturing and display, together with a recommendation on specific lighting for installation over oven outlets and other points of inspection.

Night Baking

The night baking problem goes back for over one hundred years. It was in 1848 that the first Bill was introduced to the House of Commons for the abolition of night baking. Similar Bills were introduced in 1898 and 1911, but none of these obtained the necessary support to be passed into law. In 1919 the Mackenzie Committee was appointed by the Government to enquire into the question of night baking, and its recommendations included "that subject to certain exemptions, employment in night work (*i.e.* between 11 p.m. and 5 a.m.) should be abolished after two years." A Bill to give effect to the recommendations of the Mackenzie Committee was introduced in 1920 and in subsequent years but was not proceeded with.

After the Mackenzie Committee certain other Committees, set up by Parliament, took a hand in the problem, culminating in the Alness Committee, which was appointed in 1937. The majority report of this Committee concluded "that legislation to abolish night baking is not in present circumstances desirable."

The agitation for the abolition of night work continued, and in 1938 an Act was passed by Parliament — the Baking Industry (Hours of Work) Act, 1938—which provided "that night work in bakeries is prohibited between 11 p.m. and 5 a.m. with certain exceptions." This Act was passed but was not carried into effect, the signature of the Minister of State being withheld subject to the baking industry agreeing to the formation of a Baking Trade Board.

Early in 1945 the Operatives' Union again commenced pressure for the total abolition of night baking and the Secretary was appointed to the Joint Committee. The vital difference between the operatives' side and the employers' side lies in the point that the operatives desire "the total abolition of night baking" while the employers were, in effect, ready to put into operation the 1938 Act which is only partial abolition.

The long drawn out series of meetings concluded by the Ministry of Labour and National Service appointing a Departmental Committee "to consider the desirability of abolishing or limiting the practice of night baking now prevalent in the bread baking and flour confectionery industries, to report on the economic and social consequences and to make recommendations."

On December 5, 1950, the Executive Committee submitted observations to the Departmental Committee on behalf of those of its members who would be affected by the abolition of night baking, and in April, 1951, a deputation, led by Past President A. G. Smith, gave oral evidence. The report of this Committee has now been published (*see page* 468).

Pest Control in Germany

A good deal of work was done in Germany during the war to develop new pest control materials and to find substitutes for the ones already in common use. A report* on this work, based on information obtained by various teams of investigators which visited Germany after the war, gives details of German methods of preparation of ordinary materials and of their respective properties.

The various preparations are dealt with in their chemical groups. German research and methods which were ahead of those in Allied countries are treated with particular attention, *e.g.* work on organo phosphorous compounds. Some of these compounds are "systemic" insecticides, that is, they can be absorbed by plants to kill insects which feed on them. Research after the war in Allied countries has confirmed the value of these compounds and opened up a promising new field for development.

Many of the pest control materials developed in Germany, however, were tested only to see if they were toxic, and not to discover how toxic they were. This makes it difficult to tell exactly how valuable some materials are, and further research will have to be carried out on this aspect of the subject.

The report deals with insecticides, acaricides (mite-killers), fungicides, and rodenticides. There is also an appendix which includes a description of German ways of controlling pests in stored grain and methods of commercial fruit spraying.

* *Pest Control in Germany during the Period 1939-1945.* B.I.O.S. Survey No. 32. Pp. 122. H.M.S.O. Price 3s. (75 cents U.S.A.), by post 3s. 2d.

News from the Industry

FORTHCOMING EVENTS

Society of Chemical Industry

Food Group meetings for 1952 so far arranged are as follows:

Jan. 23. "The Digestibility of Fat," by Dr. H. Wilkinson (Nutrition Panel meeting).

Feb. 13. "Butter Spoilage," by Dr. E. R. Hiscox and Mrs. E. D. Cookson.

Mar. 7. "Materials for the Conveyance and Packaging of Food," by Mr. F. A. Paine (joint meeting with the Manchester Section, the Chemical Society, and the Royal Institute of Chemistry).

Mar. 12. Visit to the Brewing Industry Research Foundation and papers on "The Chemistry of Hops," by Dr. A. H. Burgess, Mr. A. R. Tatchell, and Dr. A. H. Cook (joint meeting with the London Section of the Institute of Brewing).

Mar. 13. Annual Dinner-Dance (tentative).

Apr. 23. "Soft Drinks and Fruit Juices," by Dr. V. L. S. Charley (Nutrition Panel annual general meeting).

May 8-11. Conference on "The Quality of Cereals and their Industrial Uses" (joint meeting with the Agriculture Group and the Scottish Sections).

Details for the Summer Tour are not yet available, but this will be held in early June.

The Crop Protection Panel of the Agriculture Group has arranged the following meetings for 1952:

Jan. 8. "The Eelworm Problem," by Dr. Healy, Dr. Johnson, and Dr. Peters.

Feb. 5. "The Fumigation of Stored Products," by Mr. Burns Brown.

Apr. 1. "Locusts," by Dr. D. L. Gunn.

The annual general meeting of the Panel will be held before the lecture on April 1.

*

Royal Institute of Chemistry

Included in the programme of meetings arranged by the Royal Institute of Chemistry for December are the following:

Dec. 5. "Byeways in Chromatography," by Tudor S. G. Jones, B.Sc., Ph.D., A.R.I.C., at 7 p.m. at the South-West Essex Technical College, Walthamstow.

Dec. 19. A Symposium on Radio-Chemistry, opened by Sir John Cockroft, F.R.S. (with the London Section, Society of Chemical Industry), at 4 p.m. at the Waldorf Hotel, London.

*

Royal Society of Arts

Among the meetings arranged by the Royal Society of Arts are:

Dec. 12. "Foods and Fads," by Charles Hill, M.A., M.D., LL.D., M.P., at 2.30 p.m.

Feb. 20. "Modern Developments in Soil Science," by Sir William Ogg, M.A., Ph.D., F.R.S.E., Director, Rothamsted Experimental Station, at 2.30 p.m.

Apr. 30. "Amenities in Factory Design," by Walter R. Bennett, L.R.I.B.A., at 2.30.

*

Hotelympia, 1952

Sponsored by fifteen national associations representing all branches of the catering trade, the Hotel Restaurant and Catering Exhibition is to be held at Olympia from January 23 to February 1, 1952.

Exhibits at Smithfield

A section of the Oppenheimer Stand at this year's Smithfield Show to be held at Earl's Court from December 3-7 is being devoted to the layout and method of self service, as applied to the meat and allied trades.

To promote the sales of products in self-service stores, the Rival Packaging Division of the Oppenheimer Casing Co. (U.K.) have carried out extensive tests on packaging materials. It has been found that freshly picked lettuce packed in Hypak 200 gauge polythene film has a life of anything up to eight days from packing as opposed to a 36 hour life unpacked.

In the packaging of pressed hams, experiments have shown that a Hypak wrapping reduces dehydration to a small fraction of what it otherwise would be, and prevents development of rancidity. Normally, wrapped hams lose 2 oz. by weight after one week's storage and between 6 and 7 oz. after one month. Hams wrapped in the company's product lost only 1 oz. after a week and no further loss after some months of storage. After trials, polythene film wrapped hams were inclined to be slimy and carry some mould, a condition which could only reasonably be expected after such long storage. The flavour was, however, free from rancidity completely and the texture was moist. The normally packed hams were not only slimy and mouldy but also dry in texture.

A recent development is a polythene film "liner" for the 12 oz. wax carton used in presenting frozen foods.

*

A full range of Prestcold equipment applicable to the meat and dairy cattle trades will be exhibited, including a butcher's cold room of 150 cu. ft. capacity, which is of sectional construction with durable and rust-proof metal exterior. It is refrigerated by a fully automatic condensing unit with corrugated type division and forced air circulation fan and has a thermostatic control panel which facilitates rapid temperature pull-down or rapid de-frosting temperature recovery. Other items to be shown are the new service cabinet, an open frozen food cabinet, and other conservators; a four-churn type immersion cooler, available with churn lifting gear and rings where desired, the latter maintaining a churn upright in the water while empty or only partly full; a 1 h.p. water cooled condensing unit; and a Presmetic hermetically sealed unit that is fitted with a plastic cover instead of the normal metal one so that visitors may inspect the working parts.

Gas for the Dairyman

During recent years gas has come to be considered as an ideal fuel for use on the farm, and in particular in the dairy. As new gas grids are brought into operation, a process now going on in several parts of the country, it is becoming possible for wider sections of the countryside to have the advantage which gas supplies can bring to them.

On the Gas Council stand at the recent Dairy Show was displayed a variety of gas-fired boilers, vats, sterilisers, refrigerators, water heaters, and washing machines, together with coke boilers of various kinds.

Glass Containers for Honey

Some years ago the Ministry of Food standardised a 1 lb. glass honey jar of a design which was generally satisfactory to beekeepers and glass manufacturers, but experience showed that with certain types of honey, the jar would not hold a full pound. As a result of discussions between the Ministry, the manufacturers, and the users of honey jars, a British Standard has now been prepared covering ½ lb. and 1 lb. jars, particular importance being attached to securing interchangeability of caps for both sizes. The standard lays down ring finishes for the jar in sufficient detail to ensure this.

Bakery and Catering Technology

Scope for further development in the present curricula has been made possible by the opening of the new premises housing the Baking and Catering Department of the Birmingham College of Technology.

The Governing Body of the College and representatives of the Birmingham Education Authority were guests at the luncheon following the opening ceremony, which was performed by Alderman R. C. Yates, the Lord Mayor of Birmingham.

Centenary Celebrations

To celebrate the centenary of the firm's foundation, the staff of James H. Randall and Son spent an enjoyable day on the river on September 29 when they left Westminster Pier on a visit to Richmond.

Before lunch, the party gathered round the deck to present Mr. Randall with a terra cotta bust of himself, subscribed for by the firm. After thanking the staff, Mr. Randall presented a silver bowl to Mr. W. Goodenough in recognition of his twenty-five years' service with the firm.

During the evening, the boat again left Westminster with a party of over 250 of Mr. Randall's friends on board. Among those present was Alderman Norris Kenyon, the Mayor of Paddington, who unveiled the bust of Mr. Randall. Best wishes and congratulations were also proffered by Alderman F. W. Dean, the Mayor of St. Marylebone who said that the firm, which first saw the light of day in his borough, was an outstanding example of what family enterprise could do.

Prizes at the Dairy Show

Three of the exhibits shown by Cherry-Burrell at the Dairy Show received awards in the New Inventions class.

The first of these, the diaphragm type milk filter, has shown on the basis of extended trials at three large dairies that a 50 per cent. saving in filter cloths can be effected.

Among the company's bottling equipment exhibits, two items received awards for proved operating efficiency. The first of these was a machine for producing and packing aluminium milk bottle caps at the rate of 200 per minute; the second was a capping device which ensures maximum capping efficiency on both old and new rotary bottle fillers.

*

Mono Containers were awarded a silver cup and diploma for the most attractive stand.

X-Ray Diffraction

The advantages of X-ray diffraction have now been made available to all industrial and scientific laboratories, whether for routine material control or pure research, by the development of a perfect series of diffraction units by Philips Electrical.

Special features of this apparatus are the provision of considerable generator power within modest dimensions, the ease with which tubes can be changed, the simultaneous use of four cameras, and the provision of electrical and mechanical safety devices.

Mr. Randall with Ald. Norris Kenyon, the Mayor of Paddington.

Infra-red Plants in the Bakery

Two infra-red plants, one to dry, after washing between each bake, 25,000 patty tins per hour, and the other for curing pan-glaze on baking tins, have been supplied by the Gas Division of Thomas De La Rue and Co., to the Cadby Hall headquarters of J. Lyons and Co.

The tins to be dried are fed automatically to a travelling wire-mesh belt, which passes through a tunnel-shaped oven, fitted with 38 gas-fired, infra-red panels. The belt is motor-driven with an infinitely variable speed unit.

Discharge of the dry tins is by gravity. The oven is 30 ft. in overall length and the "drying zone" is 25 ft. long.

Designed to deal with 20,000 tins per hour, the plant has proved capable of drying 22,000 tins per hour. It is intended to raise this figure to 25,000 tins per hour in the near future.

The feed and delivery systems were designed and erected by Lyons engineering staff.

Increased efficiency and saving of time and labour have also been achieved by the employment of infra-red for curing pan-glaze on baking tins.

To obviate the necessity of greasing pans for each successive bake, Silcote, a special pan-glaze, is sprayed on to the tins after they have been thoroughly cleaned. They are then left for a "flash-off" period of 90 minutes before being fed into the oven which consists of 88 gas-fired infra-red panels.

The panels are erected round a chain-supported, wire-mesh belt (4 ft. 6 in. wide) which, as in the drying plant, are motor driven at variable speed. They rapidly raise the temperature of the tins to 500° F., which is maintained throughout the curing time. Forty-five minutes later the tins emerge with a glassy, heat-resisting surface.

After this treatment the tins withstand continuous baking use for between seven and ten days, and in some cases up to several weeks, requiring only washing between each bake.

Plant Engineers Confer

Twenty-two delegates from fifteen countries attended the second A.P.V. dairy conference held in London from October 17 to 19.

Under the chairmanship of Mr. P. W. Seligman (managing director) the conference took the form of a two-way interchange of technical and marketing information and ideas. Technical and sales staffs of the parent company and the visitors from overseas were able to discuss new processes and equipment recently introduced and under development and to express their views on associated problems of mutual interest. The suitability from the technical point of view of new items of equipment for use in different parts of the world was freely discussed and the market potentialities investigated. The specialised requirements of both home and overseas market were explored and the trend of future developments indicated.

Factory Sales

The disposal of factory premises of about 60,000 sq. ft. in Halifax, Yorks, to John Mackintosh and Sons, and of extensive premises at Sydenham which have been sold freehold and since let to well-known baking powder manufacturers, is announced by Chamberlain and Willows.

Mr. C. J. Tompkins receives the Procea Gold Cup from Mr. S. A. Lancaster.

Prizes for Bread Makers

One thousand two hundred bakers and their wives from all parts of Britain attended the sixth annual sales conference and dinner-dance of Procea Products on October 17.

Following judging for the National Award, a gold cup competed for by Procea bakers throughout the country which took place in the afternoon, guests attended the dinner and dance at the Grosvenor Hotel at which cups and prizes were presented by Mr. S. A. Lancaster, managing director of the company.

The principal speakers at the dinner were Lord Hollenden, Dr. D. W. Kent-Jones, chairman of the company, Mr. W. H. White, director of the company, and Mr. C. F. Cadwallader, director of the National Association of Master Bakers, Confectioners, and Caterers.

Conference of Carton Users

At the Packaging Conference held by Boxfoldia on October 10, Mr. Eric Humphries, managing director of Percy Lund, Humphries and Co., and joint managing director of the Ganymed Press gave a lecture on printing.

At the afternoon session, Miss Beryl Foyle, joint managing director of Boxfoldia, presented a paper entitled "Would You Buy It?" in which she gave the findings of informal but informative consumer groups whose members said what they thought about a selection of cartons put before them for their views. Cartons were purchased from shop windows or counter displays and the retailers were asked why this particular carton was on show and for his comments on it. The idea behind the commentary was to find out whether enough notice was taken of the views of the ultimate judge of the pack, the purchaser of the product.

During the conference an exhibition was held showing the processes carried out in the production of cartons.

A New Vibratory Feeder

Flour, coal and coke, wet sand, provender meal, gravel, bran, chemicals, and oilcakes are only a few of the many materials that can be handled by the new vibratory feeder now being produced by Henry Simon Ltd. The low power consumption of this machine, known as the Velofeeder, in handling all types of material is being demonstrated in the many plants throughout Britain in which it is now installed.

The feed tray of the Velofeeder, which can be 10 in., 12 in., or 18 in. wide, can be regarded as a conveyor having a working stroke variable from virtually motionless to a maximum of nearly $\frac{1}{4}$ in. at 1,850 vibrations per minute; the machine thus combines great flexibility and a high maximum output.

The Velofeeder in a Liverpool cattle food plant.

The motion of the tray is perpetuated by a $\frac{1}{8}$ h.p. motor driving a small rotating out-of-balance weight assembly that gives impulses to the "anvil" on which it is mounted, the anvil being so arranged that it can oscillate between springs. On its rearward movement the anvil collides *via* a rubber pad with the feed tray, which also oscillates between springs. The springs and mountings are so designed that the two masses—anvil and feed tray—oscillate in opposite ways and collide once in every cycle; the machine is virtually self-balancing and little or no vibration is transmitted to the frame. The force of collision determines the movement of the feed tray. Variation in the force of collision is obtained by means of a hand wheel which alters the mean distance between the two masses.

Diary cum Encyclopaedia

Handsomely bound in red leather, the new *Economist* diary (published in association with Charles Letts and Co., price 42s.) besides incorporating an excellent system for day-to-day records of appointments, provides a most useful handbook of general information. This ranges from international comparisons of income, industrial production, and changes in population and employment to a survey of personal spending on consumers' goods and services. In this section statistics are also presented of the U.K. food supplies and subsidies.

Other valuable data include details of trade and external payments, statistics of primary production, manufactures, and comparative statistics of principal countries, commonwealth and foreign.

In all, the general information sections cover seventy-two pages of specially selected data which will be of practical value to the man of affairs. Quick and easy reference is achieved by means of thumb indexes down the outside margins of each page.

Co-operative Advertising

The co-operative advertising which has been undertaken by the Metal Box Company and British Celanese was taken a stage further during October when the two companies shared an exhibit at the Marden and District Commercial Fruit Show. This featured window cartons, boats, and trays for the prepackaging of apples and pears, and a selection of soft fruit punnets, and tomato and other containers.

All the cartons on show were manufactured by the Metal Box Company, and the Clarifoil, used for the windows and over-wrapping the trays, by British Celanese.

Two new decorated containers which Metal Box are making available to the export market.

COMPANY NEWS

At a recent meeting of the Board of L. Rose and Co., an interim dividend was declared on the Ordinary Shares of the company for the year ending December 31, 1951, payable on October 31, 1951, at the rate of 5 per cent. actual, less Income Tax at 9s. 6d. in the £.

BOOKLETS RECEIVED

The responsibility for planning Bombay's new central dairy was passed to The A.P.V. Company by their Indian associates, The A.P.V. Engineering Co., who were principally responsible for equipping this dairy, which is the largest in the East and one of the most modern in the world. The story of its inception and a description of the processing plant installed are given in an illustrated leaflet which has recently been issued by the company.

*

Used extensively for the pasteurisation of milk, cream, wine, cider, fruit juice, and beer, and for preheating milk in the production of sterilised, condensed, and evaporated milk, mix cooling in ice cream manufacture, and a variety of other food and drink processing industries, Cherry-Burrell Superplate equipment is available in a wide range of capacities from 100 to 2,000 gallons per hour.

A booklet describing the features of this equipment has recently been issued by the company.

*

In their latest edition of *Inklings*, a bulletin for printers, Coates Bros. Inks describe the drying of printing inks in which the various methods used are outlined. Other articles dealt with in this issue are "Ink Drying in Relation to Printing Processes and Surfaces," and "Drying Methods used with Various Printing Processes."

*

Intended as a guide to commercial and technical departments handling alginates, a booklet published by Alginate Industries describes their physical and chemical properties and method of manipulation and deals in detail with their particular use in each individual trade.

OBITUARY

Mr. James Love Carlyle, director of George Scott and Son (London), and Ernest Scott and Co., on October 15, 1951, after a three months' illness.

He first joined the companies at their Glasgow office in 1919 and in 1921 took charge of the Manchester office. He moved to London in 1922, joining the Board in 1944.

He specialised in those branches of the companies' business concerned with the recovery, extraction, refining, and hardening of vegetable oils, the recovery of caustic soda from the paper making and textile industries, caustic soda production, electrolytic plants, and caustic soda evaporation.

He leaves a widow and three sons.

*

Mr. W. K. Kellogg, at Battle Creek, Michigan, on October 6, aged 91 years.

He did not launch the project which made his name world-famous until he was 46 years old. Since that time Mr. Kellogg not only became famous for the cereals that bear his name but also for his great gifts in the furtherance of education and health.

*

Mr. R. A. Furness, C.M.G., at the age of 55.

In the early days of the last war, Mr. Furness joined the Ministry of Food from the grain trade and served from 1941 as the Ministry's cereals expert in North America.

OBITER DICTA

• Have we to die before we can prove to the chemists that agene is harmful?—*Sir Robert Bristow.*

• The finest meal I ever had in my life consisted of home-made bread of stone-ground flour, farmhouse butter, English Cheddar cheese, pickled shallots, and a pint of beer from a cold cellar.—*Mr. Phillip Harben, the television chef.*

• We are doubtful about the use of whale oil in mincemeat. We will have to try it out, I suppose, and sell it on the lines that it is better for people to have mincemeat with whale oil in it than no mincemeat at all. —*A food manufacturer, reported in the "Daily Express."*

• We want to stop the decline in welfare foods. We want babies to have cod liver oil. We hear tales that some mothers use it to oil sewing machines or father gives it to his greyhound, but we need evidence to prosecute if there are such cases—*A Ministry of Food Official.*

• Next time you go into a restaurant for a cup of coffee and your drink is served in a cracked cup, drop it on the floor. Don't do it ostentatiously, just edge it off the table with your elbow.—*Mr. Hilton Lowndes of New Zealand addressing the Chiswick Chamber of Commerce.*

• We do not necessarily want places full of fancy gadgets, wonderful chemicals, and bacteriological aids to cleanliness, though they are useful. The real background to food hygiene is to apply the "Three H's"—horse sense, hot water, and hard work.—*Mr. Morley Parry, Food Hygiene Officer, Ministry of Health.*

• Included in the Harvest Thanksgiving Service at Speke Parish Church were some specimen finished punches of Manesty manufacture, together with some bars of raw material from which the punches were made. Manufactured products took the place of corn, fruit, and vegetables in view of Speke's now being an industrial instead of an agricultural parish.—*Manesty News Letter.*

APPOINTMENTS

At the annual general meeting of the Widnes Foundry and Engineering Co., Mr. Ralph Credland, assistant managing director of the company for the past four years, was appointed joint managing director.

*

Mr. Norman Bezzant, managing director of Nutrex, whose registered address is now Nutrex House, Maddox Street, London, W.1, has accepted the chairmanship for 1952 of the West and South of England Journeyman Confectioners', Bread, and Biscuit Bakers' Pension Society.

*

The appointment of H. C. Timewell, M.Inst.R., as manager of their Domestic Appliance Division has been announced by the English Electric Company. For ten years Mr. Timewell was well known in the refrigeration industry directing the activities of the International Refrigerator Company.

Expansion of Refrigerator Sales

From November 1, 1951, Refrigeration (Western), whose Head Office is at Shrewsbury, with branches at Llandudno, Aberystwyth, and Chester, will extend their territory to include the whole of the area previously covered by MacWhirter's of Cardiff.

This means that Pembrokeshire, Carmarthenshire, Glamorganshire, Brecknockshire, and Monmouthshire will come within the territory handled by Refrigeration (Western), who will be solely responsible for all Prestcold refrigeration sales and service within this additional area, and will operate from 79, Tudor Road, Cardiff.

World Food News

Carob Bean Processing in Holland

The transfer of their manufacturing operations from Weinfelden, Switzerland, to Zaandam has recently been completed by the Meypro company, the foremost continental processors of the carob or locust bean. Manufacturing operations are being carried out under the guidance of Mr. Rudolf Fuchs, the manager of the Swiss plant.

The newly equipped plant was opened on October 17, 1951, by the Dutch Minister of Agriculture and Food Supply, in the presence of the U.S. Ambassador, the Swiss Ambassador in the Netherlands, and numerous Swiss and Dutch industrialists and guests.

Parma Food Fair

Exhibitors from Austria, Belgium, France, Germany, Britain, Morocco, Mexico, Holland, Portugal, Spain, the United States, Switzerland, South Africa, and Tunisia attended the Sixth International Preserved Food and Packaging Show and First Food Fair in Parma.

Among the main exhibits in the preserved food section were examples of dry preserving. This Austrian method, developed by Zimmerman and presented by Schroth and Co., Salzburg, uses a dehydration process by which cooked foods can be dried and compressed in the form of tablets, their natural humidity being later recovered on cooking in water for a very short time.

A new type of container on show was a flexible aluminium tube filled with tomato concentrate. The use of aluminium in food packing was discussed at a conference which was held during the Fair.

A nailless durable box, made of hardwood and held together by eight iron corners which cannot be removed without first removing the lid and breaking the seal, was another interesting exhibit by ARSA, Milan. The opening and closing of this box can be speeded up considerably, without damaging the wood or the metal clips, and when dismantled it can be returned to the packers for repeated use. The box costs six times as much as an ordinary soft wood box, but its makers claim that packaging costs are reduced by one-tenth because the box can be used indefinitely.

Among the machines exhibited was a triple effect concentrator, with a finisher for high concentration purées, produced by Fratelli Gianazza, Legnano. It can process 70 tons of fresh tomatoes in 24 hours. A new machine for preparing fruit preserved in sugar with a capacity of 2½ to 5 tons of jam per hour was also shown by this company. In this machine the fruit never comes into contact with the outside atmosphere, and constant refrigeration is claimed to eliminate losses in processing.

OVERSEAS ENQUIRIES

Chocolates, Sweets, and Toffees

The British Consulate at Cleveland, Ohio, U.S.A., has reported that Halle Brothers Co., 1228, Euclid Avenue, Cleveland 15, Ohio, desire to obtain from the United Kingdom supplies of highest quality assorted chocolates in boxes and boiled sweets and toffees in attractive tins or other containers.

Firms interested in this enquiry should communicate direct with Miss A. Wennerstrom, Merchandise Manager of Halle Bros., giving particulars of their products, quoting C.I.F. prices and delivery dates.

*

Chocolate Bars

The British Consulate General, New Orleans, has been approached by Albright and Wood, 157, S. Royal St., Mobile, Alabama, who operate a chain of 15 retail drug stores in the city of Mobile. They have expressed interest in receiving quotations for chocolate bars to retail in the United States at 5 and 10 cents each. A mark-up of 40 to 50 per cent. should be allowed for in considering the above mentioned retail price and the current United States Customs duty leviable under Para. 777(b) of the United States Customs Tariff as follows:

(i) Valued at 10 cents or more per lb. —10 per cent. ad valorem.

(ii) Valued at less than 10 cents per lb.—20 per cent. ad valorem.

Chocolate confectionery exported to the U.S.A. has to conform to the Provisions of the United States Food, Drug, and Cosmetic Act. Copies of the Regulations of the United States Food and Drug Administration relating to chocolate confectionery are available for consultation at the Commercial Relations and Exports Department (Industries Branch) of the Board of Trade, Thames House (North), Millbank, London, S.W.1.

Interested firms should communicate direct with the United States firm sending quotations in dollars c.i.f. Mobile, indications of delivery dates, and samples.

*

Confectionery and Biscuits

The United Kingdom Trade Commissioner, Hong Kong, has been approached by Dah Dung Hong Ltd., Rooms 505-506, 14-16, Pedder Street, Hong Kong, who wish to be put in touch with manufacturers of confectionery and biscuits in the United Kingdom. The Hong Kong firm, which was established in 1950, imports industrial chemicals, textiles, leather, paper, and cardboard, and holds foreign agencies for woollen textiles, tobacco leaf, and finished leather. The business working arrangements are by confirmed irrevocable letters of credit.

Those interested should communicate direct with the Hong Kong firm.

*

Foodstuffs for Algiers

An enquiry has been received by the Board of Trade, Commercial Relations and Exports Department, from Mr. Kenneth Stewart of 86, Boulevard du Telemly, Algiers, for agencies of United Kingdom manufacturers in, *inter alia*, confectionery (dragées, fruit drops); biscuits (chocolate, plain); canned shell fish, crayfish, shrimps; canned meat products; cornflakes; gelatines; crustaceans and molluscs (preserved); green tea; pepper; and lemon and orange peels.

*

Canned Foodstuffs and Frozen Fish

The British Consulate at St. Louis, Missouri, has reported that Wilson, Harding and Kennedy, 699, South Main Street, Memphis, Tennessee (mailing address, P.O. Box 2844, Memphis, Tennessee), have expressed interest in receiving quotations from United Kingdom firms for canned vegetables and fruits, and frozen fish, catfish, halibut, and trout.

United Kingdom manufacturers responding to this enquiry should give quotations in dollars, c.i.f., an indication of delivery dates, catalogues and samples, and technical explanations.

Canned foodstuffs and frozen fish exported to the United States have to conform to the provisions of the United States Food, Drug, and Cosmetic Act. Copies of the regulations of the United States Food and Drug Administration relating to canned foodstuffs and frozen fish are available for consultation at the Commercial Relations and Exports Department (Industries Branch) of the Board of Trade, Thames House North, Millbank, London, S.W.1.

*

Food Machinery

The United Kingdom Trade Commissioner at Auckland is advised that Associated Foods Ltd., 47, Customs Street, P.O. Box 2356, Auckland, desire to secure the representation of United Kingdom manufacturers of

foodstuffs and of food machinery and food packing machinery.

Their interest in foodstuffs lies in manufacturing United Kingdom lines under royalty, or repacking branded foodstuffs. They claim to have excellent production facilities and the services of some of the leading food chemists in New Zealand. They realise, however, that certain types of foodstuffs, either intrinsically or because of the relatively small local market, are not suitable for local production or repacking, and the firm would be glad to handle such lines on the customary agency basis.

As regards food machinery and food packing machinery the firm would desire orthodox agency arrangements.

*

Chocolate and General Confectionery

The British Consulate General at Boston, U.S.A., has reported that the Bakery Corporation of America, 70, Grove St., Melrose, Massachusetts, desire to obtain offers from a United Kingdom manufacturer who would be prepared to supply them with bulk items of chocolate and general confectionery which the American firm would distribute throughout New England under their own name.

The Corporation are a new company which have acquired ownership of Miller and Hollis Inc. of Boston, manufacturers of Haviland chocolate, and it is understood that they have also purchased control of Friend Brothers Inc. of Melrose, Massachusetts. The new company are reported as owning a chain of thirty-eight confectionery stores and are planning to increase this number to sixty by the end of the year.

*

Commercial Vehicles

H.M. Consul General at Geneva has reported that the Garage du Mole, 55-57, Chemin Ferrier, Geneva, wish to represent a United Kingdom manufacturer of commercial vehicles. What the Swiss firm require is a model to carry 3½/8 tons, Diesel engine, chassis, and engine with cabin only.

Interested United Kingdom manufacturers should accordingly write direct to the Swiss firm giving prices, rates of delivery, and other details of their products together with a supply of literature.

Tetrahedron Pack for Liquids

After seven years' research, Tetra Pak of Sweden have introduced a new method of packing milk and other liquids such as oil and fruit juices.

The machine for making the new pack forms a web of plastic-coated heat sealing paper into a tube, the long seam of which is heat sealed.

Making and filling the new pack.

During a continuous movement downwards the tube is then pressed together by pairs of heat sealing irons or jaws mounted on endless chains which move downwards at the same speed as the tube. At the same time liquid is filled into the paper tube through a supply pipe from above.

The level of the liquid is kept above the seals being formed, the heat sealing irons pushing away the surplus quantity of liquid in the tetrahedrons they are forming. The quantity of liquid in the Tetra Pak is determined by the diameter of the tube-forming tool and the distance between the two consecutive pairs of heat sealing irons.

To ensure that no liquid is left in the seals, the high pressure of one ton is put upon the heat sealing irons. This makes it possible to pack such slow flowing products as ice cream and cream.

The tube leaves the machine as a garland of filled tetrahedrons which are separated from each other by a built-in cutter and which are then automatically packed in transport containers.

The advantages of the new process are savings in material, in labour costs, in space, and in transport costs.

The Tetra Pak as a milk container.

Australia's New Oil Industry

About 2,500 tons of grapeseeds a year will be the raw material for production expected to amount to 50,000 gallons of oil annually in a new enterprise at Nuriootpa, in the Barossa Valley, South Australia.

The company handling this project is the Tarac Manufacturing Co., which has for 21 years been producing thousands of gallons of alcohol from the formerly discarded grape skins and stalks.

After extraction of the alcohol and of raw material for tartaric acid and cream of tartar, it has been the practice to sell the remaining husks for manure, but now the grapeseeds will be retained to be crushed for oil. The main use of this oil will be as a paint oil like linseed; as an oil for cosmetic purposes; and as a salad oil similar to olive oil.

Sample bottles of oil viewed at a recent official inspection showed it to be of excellent quality and pleasing appearance.

Fish Canning Problems Investigated

Details of the investigations carried out by the Fishing Industry Research Institute of Cape Town are contained in the fourth annual report which covers the period April 1, 1950, to March 31, 1951.

In the canning of rock lobster, the problems of brown discoloration were studied; research into the best methods for brining and retorting in the canning of pilchards was also carried out. Among other items mentioned in the report are the results of investigations carried out in connexion with tomato purée, snoek in oil, canned stockfish, fish paste, tunnel cooling of canned fish, salted pilchards, and the transport of frozen rock lobster tails.

Obituary

Mr. Stanley H. L. King, managing director of the Associated Chocolate and Confectionery Co., which embodied the Rowntree and Mackintosh interests in Ireland, at the age of 59.

Mr. King, who was a native of Halifax, went to Ireland in 1925 as manager of the former North Kerry Manufacturing Co. He was a prominent member of the Chocolate Manufacturers' Association.

News from the Ministries

Food Standards Committee

Mr. A. J. Howard, M.A., F.R.I.C., Director of Scientific Development in the Ministry of Commerce for Northern Ireland, has been appointed an additional member of the Food Standards Committee.

Anglo-Czech Trade Talks

Agreement has now been reached with a Czechoslovak trade delegation which has been in London since June about the arrangements for a third year (ending June next) of the five-year Trade and Financial Agreement concluded on September 28, 1949.

Quotas for the year for the import of Czech goods, including timber and sugar, and of less essential goods of Czech origin, have been agreed, as well as quotas for the export to Czechoslovakia of United Kingdom miscellaneous goods, including herrings.

Imports from Czechoslovakia may be expected to reach a total of £13 million.

Sugar for Bees

Beekeepers may draw their winter and spring allowances of sugar at any time they wish up to June 28, 1952. They are no longer required to draw their winter allowance before January 26, 1952. The maximum allowances per colony for next winter and spring are 10 lb. and 5 lb. respectively.

Application for permits on the official form, obtainable at local food offices, may be made at any time before June 28, 1952. The completed form should be countersigned by a responsible person and returned by the applicant to the food office. Separate forms will be needed if the allowances are drawn in two or more parts.

Trade Agreement with Germany

Discussions for a new trade agreement between the United Kingdom and the Federal Republic of Germany were concluded on October 1.

Under the new trade agreement, the principal exports to Germany from the United Kingdom will be cotton, wool and linen yarns, textile machinery, and miscellaneous chemicals, besides seasonal exports of fresh and cured herrings. The United Kingdom will take from Germany, in addition to steel and other metal manufactures, a number of foodstuffs, dyestuffs, and miscellaneous chemicals. Germany will also facilitate certain essential supplies of steel and other goods.

Prepacking Fish Products

The Fish and Fish Products (Control of Packing) Order, 1942, has been revoked with effect from September 9, 1951. Licences will now no longer be needed to prepack (otherwise than by canning) fish paste, rollmop herrings, and other types of marinated fish, in containers made wholly or mainly of metal, glass, or earthenware.

Import of Mincemeat

Applications will be considered for the import of the mixture of fresh or dried fruit with other ingredients, commonly known as mincemeat, from any country other than Albania, Argentina, Bolivia, Bulgaria, Canada, Colombia, Costa Rica, Cuba, Czechoslovakia, Dominican Republic, Ecuador, El Salvador, French Somaliland, Germany (Russian Zone), Guatemala, Haiti, Honduras, Hungary, Japan, Korea, Liberia, Mexico, Nicaragua, Panama, Persia (Iran), Philippines, Poland, Roumania, Tangier, Union of Soviet Socialist Republics, United States of America, Venezuela, and Yugoslavia.

Consideration will also be given to applications submitted by, or on behalf of, manufacturers of mincemeat, for licences to import from the same sources other mixtures containing not less than 30 per cent. dried fruit or peel, 30 per cent. added sugar, and 2½ per cent. suet or equivalent fat.

In all cases the composition of the mixture should be stated and samples should be sent with the applications, which should be made to the Board of Trade on form ILB/A (Revised), which may be obtained from the Import Licensing Branch, Board of Trade, Romney House, Tufton Street, London, S.W.1, from the usual Customs Offices, or from the Ministry of Food, Miscellaneous Foods Division, Carlton Hotel, Haymarket, London, S.W.1. For administrative convenience, applications and samples should be sent to the Board of Trade through the Ministry of Food at the above address.

Use of Egg Products

The Egg Products (Control and Maximum Prices) Order, 1946, has been amended so as to prohibit the manufacture of any article containing more than 25 per cent. of egg product, as defined in that Order, other than frozen egg.

The dried egg now available is not suitable for sale to the public for ordinary domestic use. The purpose of the new Order is to prevent supplies allocated for trade use from being employed in the production of mixtures containing a high proportion of dried egg for sale by retail.

Meat from Australia

NEW AGREEMENT SIGNED

The newly signed meat agreement, which runs for 15 years and takes effect from July, 1952, provides that the Australian Government will do everything possible to encourage the expansion of production. Plans for expanded production have already been drawn up and further plans are in preparation. It is the view of the Australian Government that the prospect of long-term security for producers and the removal of any fear of over-production will, combined with the assurance of profitable prices, provide a tremendous incentive to increased production.

There will be minimum prices equal to the 1950-51 prices for beef and veal for an initial period of six years and for mutton and lamb for three years. This assurance of minimum prices is designed to justify and encourage capital expenditure both by Australian Governments and primary producers. Provision is made to extend these minimum prices for several years beyond the initial terms. This is again for the purpose of encouraging developmental expenditure in the sure knowledge that during a known period producers' returns cannot fall below a stated figure.

From year to year the actual prices paid will be related to costs of production and other considerations, which will ensure a continuing incentive to production and will avoid exploitation of consumers.

It is also provided that, if the purchase of Australian meat is returned to private trade, both Governments will make such arrangements as will enable them to meet their obligations under the agreements. It is confidently hoped that under the stimulus of these agreements much new land will be brought into production to the greater benefit of both countries.

Further negotiations are also in progress on pig meat; these will include consideration of the principles upon which prices might be negotiated for a period beyond the forthcoming year.

Information and Advice

This Service is available for subscribers to FOOD MANUFACTURE. Postal replies will be sent if a stamped, addressed envelope is enclosed with enquiries.

Slackness in Jams

B.5411. *Can you tell us what are the causes of slackness in jam?* (London.)

There are seven main reasons for slack jam. These are:

1. Prolonged boiling which causes hydrolysis of pectin and gives the product a syrupy consistency.
2. Too high acidity which has a similar effect, and breaks up the jelly network, causing syneresis (bleeding).
3. Too low acidity which impairs the setting properties of pectin and frequently inhibits jelly formation.
4. Fruit which contains buffers in the form of natural mineral salts. These salts delay and, if present in large quantities, prevent setting entirely.
5. General pectin deficiency of the fruit or fruit pulp.
6. Too much sugar in proportion to pectin and wrongly balanced formulae.
7. Excessive cooling prior to filling which causes the phenomenon frequently referred to as "broken set."

In order to determine which of the aforementioned causes is responsible for the slackness, it is necessary to check the soluble solids content, acidity, *p*H value of the product, and, if necessary, the setting properties of the pectin, fruit, or fruit pulp.

Bottled Fruit

B.5408. *Would you please furnish us with some details of the processes involved in the bottling of fruit.* (Yorks.)

Fruit is generally bottled in vacuum jars made to withstand the heat of sterilisation, fitted with glass or metal lids, with a rubber ring to act as a washer between the lid and the bottle, the lids being secured with either a spring clip or preferably a screw band. The bottles must be sterilised before the fruit is added to them.

All fruit to be bottled should be quite sound and free from blemish. Gooseberries are bottled when green and under-ripe. Strawberries, raspberries, loganberries, currants, peaches, apricots, and cherries should be ripe and quite firm when required for bottling. Plums, greengages, and damsons are bottled when nearly ripe. All fruit should be bottled as soon as possible after picking to get the best results.

The fruit is graded before bottling, the fully ripe, under-ripe, and blemished fruit being set aside for manufacture into jam or jelly. The best fruit is graded into two sizes, large and small, each being bottled separately. The fruit should be washed in cold water and drained under cover. It is then freed from stalks and stems. Gooseberries should be hulled.

When the fruit has been prepared and dried, it is carefully packed as tightly as possible without crushing into the sterilised bottles. The bottles are sharply tapped to shake the fruit into position. They are then filled up with boiled water. The rubber rings and screwbands or lids and clips are then fitted on to the bottles, and they are sterilised by placing them in a boiler or sterilising pan, so that they are completely covered with water. A gradual increase in temperature is required, so that the heat will penetrate to the centre of the pack. The length of time required for cooking depends chiefly on the nature and hardness of the fruit. The temperature of the pack is raised slowly over a period of 1½ hours to 170° F., and then maintained at that temperature until the fruit is cooked.

Soft fruit such as raspberries, loganberries, and strawberries require 10 to 15 min. at 165° F. Apples require about 20 min. at 170° F., pears 30 min., and apricots 15 min. Plums, greengages, gooseberries, and damsons require about 20 min. Blackcurrants and redcurrants require 20 min. at 180° F. Cherries require 30 min. at 190° F.

When cooking is completed, the bottles are removed from the steriliser and the screwbands are immediately tightened. Faulty bottles are discarded, the bottles are wiped clean, and when quite cold are stored in a cool dry storehouse, away from the light. If the storeroom is damp the rubber bands become damp, and mould growth sets up around them, which would in time force its way into the bottles. The fruit loses its colour if exposed to the light. Fruit bottled in this manner will keep fresh for a considerable period.

Hard Sugar Goods

B.5435. *Can you give us a recipe for the production of boilings in a vacuum steam cooker?* (Ireland.)

The following recipe is given as a basis for experimentation:

Granulated sugar	112 lb.
Corn syrup	56 lb.
Citric or tartaric acid	1½ lb.
Oil of lemon	1 fl. oz.

This will give a corn syrup content of approximately 33⅓ per cent., and subject to manufacturing conditions being satisfactory, corn syrup contents of from 25 to 33⅓ per cent. would produce dry, stable goods.

The sugar-corn syrup mixture is cooked to 280° to 285° F. After pumping the batch into the vacuum vessel, an operation which takes about three minutes, the vacuum is broken as soon as the syrup has been drawn in. Proportionate amounts of acid and flavour are incorporated into the portions of the batch as they are transferred to the cooling slab and passed through the moulding machine.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.5380. *Aluminium sheets.* (Scotland.)
B.5381. *Can marking.* (Ceylon.)
B.5386. *Fish cakes.* (Lancs.)
B.5388. *Frozen food.* (South Africa.)
B.5389. *Mincemeat.* (Ireland.)
B.5390. *Pickling red cabbage and beetroot.* (Yorks.)
B.5392. *Jelly injector.* (Lancs.)
B.5393. *Flooring material.* (Lancs.)
B.5396. *Sherbert powder.* (Sweden.)
B.5403. *Fruit canning.* (Lancs.)
B.5404. *Macaroni and vermicelli.* (London.)

Information Required

B.5416. *Manufacture of Feta cheese.* (Australia.)
B.5419. *Manufacturer of Peatrex pea colouring compound.* (Mont.)
B.5459. *Manufacturers of cocoa bean waste or cocoa shell meal.* (Lancs.)

Recent Patents

657,295. ELECTRONISED CHEMICAL CORPORATION: Methods of sterilising and preserving foodstuffs, drugs, and pharmaceutical preparations.
657,324. SAUNDERS VALVE CO., LTD., PRICE, R. H., and KAYE, O.: Diaphragm valves.
657,420. EAST ANGLIA CHEMICAL CO., LTD.: Production of sucrose syrups.
657,452. TRIGGS, W. W.: Centrifugal separators.
657,519. KILLENGREEN, J. A.: Process for the manufacture of a soft cheese.
657,535. FOSTER INSTRUMENT CO., LTD., and HACKETT, C. E.: Automatic temperature control systems.
657,576. STEVENS, A. H.: Device for extracting bakery products from open top baking containers.
657,579. LILLEY AND CO., E.: Vitamin preparations.
657,602. LEVIN, D.: Devices for peeling oranges and like citrus fruit.
658,411. PITTSBURGH PLATE GLASS CO.: Process of obtaining a vitamin A concentrate from vitamin-containing fish liver oils.
658,412. NEEF, F.: Production of coffee or tea flavoured beverage powders.
658,515. INDUSTRIAL PATENTS CORPORATION: Method and apparatus for ageing meat.
658,627. ORMEAU BAKERY, LTD., CUSDIN, A., MCHENRY, R. T., and HAMILTON, J.: Apparatus for moulding dough.
658,669. ROHM AND HAAS CO.: Preparation of one or more basic amino acids from a mixture of amino acids.
658,806. STEVENS, A. H. (American Home Foods, Inc.): Concentrated coffee extracts.
659,147. BAKER PERKINS, LTD.: Dough dividers.
659,376. LAING, J. W., and STARNES, P. E.: Apparatus for measuring and/or controlling the consistency of a paste or slurry in a revolving mixing pan.
659,493. LAVERY AND CO., LTD., J. H., and CROSLAND, E. M.: Containers for foodstuffs.
659,549. AMERICAN VISCOSE CORPORATION: Machine for making sausages.
659,686. MADSEN, H. E.: Blades for bakers' peels.

Abstract of Patent Specification

The Production of Gelatine

A continuous process for the production of gelatine from skin shreds is described which comprises passing the shreds in the form of a succession of separate loose packs, with intervals between the packs, through an extraction zone, passing an aqueous collagen-hydrolysing and gelatine-extracting agent through the zone countercurrent to the travel of the shreds. A pressure gradient is maintained in the extraction zone which gradually increases and then gradually decreases as the material travels through the extraction zone and heating the zone. In particular, a temperature gradient may be provided in the extraction zone so that the highest temperature occurs where the pressure is at its maximum.

In this procedure the material to be extracted is conveyed through the extraction zone in separate sections of a conveyor mechanism, and the extracting medium is caused to travel through narrow passages between two successive sections for passing from one of the sections to the next one. Owing to this feature a stirring action favourable in respect of extraction efficiency and lack of felting is produced in each of the sections.

A convenient and advantageous manner of carrying out the above process is to provide a variable hydrostatic pressure by arranging the extraction zone as a passage having a downwardly directed portion, an upwardly directed portion, and an intermediate horizontal bridging portion, thus, in particular as a U-shaped passage.

654,597. *René Emile Auguste Joseph Frechin.*

Trade Marks

DISTIVIT.—694,824. Flour, cereal preparations for food for human consumption, bread, biscuits (other than biscuits for animals), cakes, pastry, non-medicated confectionery, and edible yeast. **The Distillers Company (Biochemicals), Limited,** Fleming Road, Speke, Liverpool, 19; Manufacturers.

COBANA.—694,905. Cocoa butter. **Cocoa and Colonial Merchants, Limited,** 112-113, Fenchurch Street, London, E.C.3; Merchants.

UNION.—694,961. Preserved, dried, and cooked fruits; preserved, dried, and cooked vegetables; and canned meats and canned fish. **Canners Agencies, Limited,** Plantation House, Fenchurch Street, London, E.C.3; Merchants.

VACKERY.—695,223. Fresh vegetables, fresh fruits, fresh mushrooms, edible nuts; and grains and cereals. **Graham and Jordan, Limited,** Graham House, Albert Square, Belfast, Northern Ireland; Merchants.

VINHOGG.—695,564. Sauces, spices, and vinegar. **John William Hoggett,** trading as **Hoggetts Products,** 16½, Askew Road West, Gateshead, 8, County Durham; Manufacturer.

POLKA.—695,609. Canned meats. **Rutzou, Limited,** 44-46, Tooley Street, London, S.E.1; Merchants.

PARK-ONA.—695,836. Cakes. **Park Cake Bakery, Limited,** Hathershaw Park Bakery, Hathershaw Lane, Oldham; Manufacturers.

RIGGER.—696,035. Fish (other than live fish) and fish products (for food). **Aksjiselskap Herkules Canning Company** (a Company incorporated under the laws of Norway, Stavanger, Norway); Canners.

BECASSINE.—696,115. Cheese. **Kurt Joseph Liebmann,** 14, Seething Lane, London, E.C.3; Merchant.

DAIRYPRINCE.—696,124. Dairy products for food. **Danco Export and Import, Limited,** 12, Whitehall, London, S.W.1; Exporters and Importers.

DUTCH BOY.—696,187. Toffees. **Henry W. Peabody and Company of London, Limited,** 16, Eastcheap, London, E.C.3; Merchants.

DISTAFEED. — 696,540. Agricultural products and grains, and foodstuffs for animals, and malt. **The Distillers Company (Biochemicals), Limited,** Fleming Road, Speke, Liverpool, 19; Manufacturers and Merchants.

Recent patents and trade marks have been selected from the "Official Journal of Patents" and the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

New Companies

But an' Ben, Limited. (495124.) 344, King Street, Hammersmith, W.6. To carry on business of bakers, pastrycooks, refreshment contractors and caterers, etc. Nom. cap.: £100 in 1s. shares. Dirs.: Ethel M. Reader, 344, King Street, Hammersmith, W.6 (permt.); A. L. Reader, 37, Riverview Grove, Chiswick, W.4.

E. Willetts and Sons, Limited. (495126.) 59, High Street, Blackheath, Birmingham. To carry on business of confectioners, etc. Nom. cap.: £5,000 in £1 shares. Permt. dirs.: Maria Willetts, 59, High Street, Blackheath, Birmingham; W. H. Willetts, 14, Alwyn Road, Blackheath, Birmingham; Mercy Haynes and Ruth Harris.

Hanworth Food Products, Limited. (495132.) 22a, College Hill, Cannon Street, E.C.4. Nom. cap.: £40,000 in 120,000 ord. shares of 5s. and 200,000 defd. shares of 1s. each. Dirs.: Sir G. Aylwen, Bt., 3, Lothbury, E.C.3; G. Cambitzi, 19, Chesham Street, S.W.1; N. Marangos, 3, Grosvenor Square, W.1.

Cases (Halifax), Halifax. (495246.) Paragon Works, Wellington Street South, Halifax. To carry on business of box manufacturers, packing case makers, etc. Nom. cap.: £1,000 in £1 shares. Permt. dirs.: H. Bottomley, Brocton, Lea Avenue, Skircoat Green, Halifax; F. Bottomley, Selway, Skircoat Green, Halifax.

Colin Canning, Limited. (499808.) The Briars, Lea Town, Preston, Lancs. To carry on business of manufacturers of and dealers in chocolates, confectionery, mineral waters, etc. Nom. cap.: £1,000 in 750 pref. of £1 and 2,000 ord. shares of 2s. 6d. each. Dir.: C. J. Canning, The Briars, Lea Town, Preston, Lancs.

Marsland and Sons (Liverpool), Limited. (499832.) 36, Childwall Valley Road, Liverpool. To take over business of sausage casing manufacturers carried on as "E. Marsland and Sons" at Liverpool. Nom. cap.: £1,000 in £1 shares. Dirs.: Mrs. M. E. Marsland, 36, Childwall Valley Road, Liverpool; E. Marsland, 128, Broadgreen Road, Liverpool, 14; J. H. Marsland; and Mrs. M. L. Duffy.

Broadacres Bakeries, Limited. (499862.) 24/38, Enfield Road, Leeds. To take over business carried on by Boyd's City Bakeries, Ltd., for the purpose of the reconstruction thereof, etc. Nom. cap.: £25,000 in £1 shares. Dirs.: A. Gray, 28, Lynwood Crescent, Leeds, 12; R. B. Hopkins, 20, Park Row, Leeds, 1.

John Binns (Salford), Limited. (499887.) 198a, Eccles Old Road, Pendleton, Salford, 6. To carry on business of general caterers, bakers, confectioners, etc. Nom. cap.: £10,000 in £1 shares. Dirs.: J. Binns, 65, Victoria Road, Pendleton, Salford, 6; J. Binns, 67, Victoria Road, Pendleton, Salford, 6.

Elliotts Bakers (Bishop Auckland), Limited. (499917.) To take over business of a baker and confectioner and general dealer carried on at Bishop Auckland, Co. Durham by Jas. Elliott. Nom. cap.: £6,000 in £1 shares. Dirs.: W. Summerson, Narvik, West Auckland, Co. Durham; G. Summerson, Sunnybrook, West Auckland, Co. Durham; T. Summerson, W. Drayton, Elsie Summerson, and Herbertina Drayton.

From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.

FOOD MANUFACTURE

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